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DOS
Shareware Utilities

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Windcrest®/McGraw-Hill

FIRST EDITION
THIRD PRINTING

Library of Congress Cataloging-in-Publication Data

DOS shareware utilities / by PC-SIG, Inc.
p. cm.
Includes index.
ISBN 0-8306-2488-0 (paper)
1. Utilities (Computer programs) 2. PC-DOS. 3. MS-DOS I. PC-SIG, Inc.
QA76.6.U84D67 1991
005.4'3—dc20 91-18673
CIP

TAB Books offers software for sale. For information and a catalog, please contact TAB Software Department, Blue Ridge Summit, PA 17294-0850.

Acquisitions Editor: Ron Powers
Book Editor: John C. Baker
Director of Production: Katherine G. Brown
Book Design: Jaclyn J. Boone
Cover Design: Sandra Blair Design, Harrisburg, PA WP1

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Foreword

The world of Shareware is constantly growing, expanding, and changing. At the beginning of 1990, when I wrote my book on Shareware, it was estimated that there were 85,000 Shareware programs available. In just a short time, that number is estimated to exceed 100,000 programs—and it's growing daily. Shareware authors are working hard to fill the needs of users—users like you. Just as the number of programs in circulation keeps on growing, the quality of Shareware is steadily improving also. It's a difficult task to keep up with Shareware because every day there is something new. Another factor to consider is that there are so many different categories that Shareware programs can be placed in. One thing is certain: you can find programs in Shareware that you'll never find in the retail market. The treasure trove that Shareware software represents overflows with an abundance of inexpensive, yet well-written programs.

That's why I was glad when the people at TAB Books told me that they were going to release a series of books on different areas of Shareware—books like this one, *DOS Shareware Utilities*, which covers some excellent Shareware programs. This book will give you a good look at some really well-written Shareware, tell you how it works, and how to register it. In these pages, you'll look at programs that have vastly different goals—from printer utilities to virus protection programs. I've read *DOS Shareware Utilities* and I think that you'll find it beneficial. Many of the programs that are discussed are programs that I use myself. They are some real winners.

The key thing to remember is that Shareware does provide a viable alternative to more expensive retail software and you get to try it before you buy it. I sincerely hope you'll enjoy *DOS Shareware Utilities*. If you use any of the programs discussed in this book, be sure to register them with their author. By supporting the authors of the Shareware products you use with

your registrations, you help encourage authors to go on to write even better software. In that way, the Shareware concept works for all of us. It's my pleasure to introduce *DOS Shareware Utilities*, and I hope that you'll watch for the entire series of TAB Books on Shareware.

Michael E. Callahan
(aka Dr. File Finder)
Editor-in-Chief, *Shareware Magazine*
Elizabeth, Colorado

Introduction

Not long after the IBM PC was introduced, the idea of shareware was born. In essence, shareware is an unorthodox marketing concept in computer software that allows computer users to completely evaluate software before buying it. Shareware is distributed free of charge, or for a nominal fee, to anyone who might be interested in it. If you like the software and want to use it, you simply pay for it by sending a fee to the shareware author. If you don't want to use it, the best thing to do is to pass it on to someone who might. The whole thing works on the honor system and, as much as that would seem to go against human nature, it has been working well for many years.

Not only will shareware programs give you the uncommon opportunity to try before you buy, but almost without exception, they offer a substantial saving over their commercial equivalents. The major reason for this discount is that the shareware concept greatly reduces the cost of marketing software. Many programs are available as shareware that would not be available otherwise, simply because it would not be cost effective to market them. As long as users continue to support it, the shareware concept will continue to benefit everyone.

Although shareware is not distributed through traditional sales channels, there are many accessible sources. Often, shareware is simply circulated from user to user, among friends, or through established user groups. Shareware also is available from the numerous electronic bulletin board services throughout the country. Perhaps the safest and most reliable way to obtain shareware is through libraries like PC-SIG.

The shareware programs in this book have all been supplied through the PC-SIG library. PC-SIG is the largest distributor of shareware and pub-

lic domain software in the world. The PC-SIG library currently offers over 6,000 programs and is growing every day.

This book presents a collection of programs that fall under the category of DOS utilities. Actually, the word utility is used rather loosely here. Utility programs usually are considered small special-purpose programs that perform a very specific task. Some of the programs in this book are just that. Others, however, are very wide-ranging, full-featured programs that can perform a variety of tasks. The main reason we call them utilities is that they don't fall under any of the other major software categories, e.g., business software, scientific software, programming software, etc. They are, for the most part, general in their application. There should be something here for everyone.

With few exceptions, this book furnishes the complete documentation for each of the programs included. As you decide which programs you might like to use, you can refer to the documentation in this book to help you completely evaluate each shareware package. After registering your shareware, keep the book handy as a reference. It should be all you need.

Included with this book is a disk containing several of the programs featured in the book. This disk will allow you to immediately evaluate these programs firsthand. Remember that these programs are only for evaluation. If you want to keep using them, you'll have to register them. All of the necessary registration information is included in the documentation.

It is important to emphasize that you must always register any shareware that you decide to put into use. Having shareware users register their programs is the only way that we can ever expect the concept to continue working. In addition, paying the registration fee usually entitles you to some additional benefits. These benefits often include a disk with the latest version of the program, technical support, and notification of program updates.

There are many fine books that explain the workings and use of MS-DOS. This book does not attempt to be one of them. We must make the assumption that you know at least the basics of DOS. It will be helpful if you already know what the DOS prompt is, what a directory path is, how to name a file, and what a batch file is.

The syntax conventions used in this book resemble those used in any book about personal computers or MS-DOS. Command-line syntax (i.e., what you type at the DOS prompt) is illustrated in this example:

PROGRAM *filename* [*options*]

In this case, PROGRAM is the name of the program you want to execute. The word *filename* represents a proper DOS filename. Anything in brackets, [ ], is optional. Optional items usually will include parameters, or switches, that tell the program to do specific things. The documentation always will contain a list of the options, explaining what the options do. Anything in the command line usually can be typed in upper- or lowercase; any exceptions will be stated in the text.

Any filenames, parameters, or variables that you need to supply are italicized, as in the last example. Data that is to be entered exactly as it appears will not be italicized.

Keys to be pressed in sequence are separated by commas. For example,

Esc, Y, Enter

means that you should press the Esc key, then the letter Y, followed by the Enter key. When you are to press several keys simultaneously (hold down one key then press another), the keys to be pressed will be connected with a dash, or hyphen.

Ctrl – Alt – Del

is the three-key combination used to reboot your computer. Hold all three keys down at the same time.

1
Memory management

Ask any PC user what the greatest limitation on MS-DOS is and invariably the answer will be the "640K barrier." With the latest memory-hungry software pushing the limits of 640K, memory management is becoming more and more important.

One of the best ways to get around the 640K barrier is by using expanded memory. Expanded memory comes to us from three of the PC industry's giants, Lotus, Intel, and Microsoft, who got together and created the Expanded Memory Standard, called LIM/EMS. Over the years, the standard has continued to be developed and is now at version 4.0. Many popular programs like Lotus 1-2-3 and XyWrite use expanded memory, which is great if you have the expanded memory hardware to support LIM/EMS. What if you don't? The answer to that is VMS40. VMS40 is a device driver that will use space on either a hard disk or a floppy disk as LIM 4.0 expanded memory.

Many people like the convenience of memory-resident programs, but the amount of RAM they take up prevents them from running some of their applications. The solution is to reduce the size of your memory-resident programs with The SWAP Utilities. The SWAP Utilities reduce the resident size of seven popular memory-resident programs by swapping the programs in and out of high RAM. In the absence of high RAM, SWAP will use disk space.

VMS40 (Disk 1957)

Special requirements None, although it works much better if you have a hard drive.

LIM 4.0 Expanded Memory Standard is used by many software packages as a way to break the infamous DOS 640K barrier. Spreadsheets, like Lotus 1-2-3, and word processors, like XyWrite III Plus, can greatly increase their workspaces using expanded memory. TSRs, like Borland's SideKick Plus, can reduce their resident size with expanded memory. An expanded memory board normally is required in order to use LIM 4.0. VMS40 will allow you to use disk space instead of expanded memory hardware. The trade-off is speed. Disk access is much slower than memory access. However, if you occasionally work with large documents or spreadsheets or you like to keep your TSRs handy but can't spare the extra RAM, then VMS40 might be a cost-effective solution.

All of the EMS 4.0 functions that can be implemented through software are provided by VMS40, with the exception of the DMA functions included in the Alternate Map Register Set function (function 28). Chances are you'll never miss the DMA function. The program is backward compatible with software written for the earlier LIM 3.2 standard.

The trial version, VMS40.240, that you will receive as shareware restricts you to reserving no more than 240K for LIM memory. The registered version, VMS40.SYS, allows you to reserve up to 32Mb.

Using VMS40

Like all device drivers, VMS40 is installed automatically when booting up DOS. Include the following statement in your CONFIG.SYS file:

DEVICE = [*d:path*] VMS40.240 [*d:*] [*nnn*]

d:path	Specifies the drive and path where the driver resides. This parameter must always be included unless VMS40 is in the root directory of the boot drive.
d:	Specifies which drive to place the Virtual LIM memory on. If omitted, VMS40 defaults to C: if you boot from a hard disk, and A: if you boot from a floppy disk.
nnn	Specifies the amount of memory you wish to reserve (in kilobytes). If omitted, the trial version defaults to its value of 240K, while the registered version uses a default value of 360K.

Details

You will need to use a text editor to add the DEVICE statement to your CONFIG.SYS file. Any text editor will do, including EDLIN, which is normally included with DOS. See your DOS manual for more details on the CONFIG.SYS file, the DEVICE statement, and EDLIN. Once you have the

DEVICE statement in the CONFIG.SYS file, VMS40 will immediately spring into action.

As with all device drivers, once installed, VMS40 can only be removed by first removing the DEVICE statement from the CONFIG.SYS file and then rebooting.

The VMS40 driver logically maps disk-memory pages of 16K blocks into four contiguous physical pages of conventional RAM. Including the 64K physical page map area, the installed size of the driver is approximately 69K. VMS40 cannot map the pages into any other area than the 64K window it allocates automatically on boot up.

The program creates a file called $VMS40@@.VM$ in the root directory. The file's attributes are System and Hidden. It is allocated at the appropriate size to hold the LIM memory pages. Don't ever try deleting the file if you have the driver running. If you allocate the file on a floppy, don't remove the floppy while the driver is running.

Testing has proven VMS40 compatible with almost all other programs that use LIM memory. The one exception was a print spooler that used LIM memory to store printing and hooked the timer interrupt to wake up and print in background. The spooling program interrupted DOS occasionally. If DOS was accessing the disk when VMS40 also tried to access disk, the computer crashed. This proviso applies to any TSR that uses LIM memory to store information, if that TSR can wake up in background. TSRs that must be popped up first are no problem. Fugue Software offers a print spooler that will work with this driver and other TSRs and that does not take over the timer interrupt. If you're interested in the print spooler, you can inquire about it when you register VMS40.

Examples

```
DEVICE = VMS40.240
```

If VMS40.240 is located in the root directory of the boot drive, 240K (the default value) will be allocated on the boot drive for use as extended memory.

```
DEVICE = C:\UTILS\VMS40.SYS 6000
```

This command will install the full version of VMS40 (that you receive when you register) residing in the directory named UTILS on drive C:. VMS40 will set aside 6,000K,or 6Mb, on drive C: (assuming C: is the boot drive) for expanded memory.

Registration

Upon registering VMS40, you will receive the full version of the program, VMS40.SYS, which will allow you to reserve up to 32Mb of disk space as expanded memory instead of just 240K. Send $25 along with any constructive comments or questions to:

Fugue Software
P.O. Box 942
Woden Act 2606
Australia

The SWAP Utilities (Disk 1883)

Special requirements none.

The SWAP Utilities intercept certain DOS calls made by RAM-resident applications and "swap" the entire resident portion of the application to extended or expanded memory or to disk files. For most applications, this swapping will greatly decrease the amount of "real" RAM needed to load these popular resident programs. The individual SWAP Utilities are

SWAPSK for SideKick
SWAPSP for SideKick Plus
SWAPTN for Tornado
SWAPMT for Metro
SWAPMM for MemoryMate
SWAPSH for PCTools Shell
SWAPDT for PCTools Desktop
SWAPNG for The Norton Guides

When used in conjunction with a memory manager with "high DOS memory" capabilities, The SWAP Utilities will permit you to run these TSRs in 0 bytes of low DOS memory. Some examples of these memory managers are Qualitas' 386Max and Move-Em products or Quarterdeck's QEMM and QRAM products.

The memory used (excluding environment space) for the various SWAP Utilities is:

SWAPDT 7,644 bytes
SWAPSH 6,816 bytes
SWAPSP 6,944 bytes
SWAPSK 6,608 bytes
SWAPTN 6,512 bytes
SWAPMM 6,656 bytes
SWAPNG 6,480 bytes
SWAPMT 7,936 bytes

If swapping to disk, two swap files are created in the drive and directory specified with the command line option /D or the TEMP environment variable. A third swap file is created no matter what swapping method you have selected.

In the sections below, the individual SWAP utility programs will be referred to collectively by the term SWAP??. The installation programs

will be referred to as TEST??. If something applies specifically to a single SWAP utility program, the full name of the program will be used.

Using The SWAP Utilities

Running a SWAP utility is actually a two-step process. Before using one of the swapping programs, you must first run a test program. Once that has been done, your SWAP utility is ready for use. The process is explained in more detail later.

Running TEST??.COM

Before running each SWAP utility for the first time, you must run its matching TEST??.COM program. TEST??.COM will detect your hotkeys and otherwise configure SWAP?? to match your individual copy of the application.

Copy the appropriate SWAP??.COM and TEST??.COM files to the directory that contains your application. If, for example, you are installing SWAPSP.COM to swap Borland International's SideKick, copy SWAPSK .COM and TESTSK.COM to the directory on which your SideKick files are stored. While at the DOS prompt in that directory, type the following:

```
TESTSK
```

TEST?? takes no command line parameters and will display a group of hexadecimal addresses, as shown in FIG. 1-1. If you have any problems with SWAP??, the information provided by TEST??.COM is intended to help Innovative Data Concepts identify and correct them.

Once TEST?? has been run, it is necessary to run it again only if you reinstall your application, change operating parameters (as with SideKick's INSTALL program), or otherwise change the configuration or hotkeys. If you make any such changes, it is essential that you run TEST?? again.

```
SideKick Version is 1.56A
SideKick Hotkey is Control-Alt
SideKick Counter is 0237
Pasting Key is at 028c
Pasting Routine is at 0b52
```

1-1 This information is displayed when running TESTSK.COM.

Using The SWAP Utilities with DESQview

In order to successfully use any of The SWAP Utilities loaded globally with DESQview, you must run TESTDV.COM first. Copy TESTDV.COM and T2-PIF.DVP into your DESQview directory. If you already have a T2-PIF.DVP

file, rename the one provided with The SWAP Utilities to a different filename. Select "Add a Program" and add the "SWAP Utilities Configuration" to your program list. Then, open the window, jot down the options specified by TESTDV, and add the options to your SWAP?? command line. Once you run TESTDV, it is needed again only if you change the TSRs that you load globally with DESQview.

If the application program you're using has multiple memory size options (as do SideKick Plus, Desktop, and Metro), then you must install that program to use the maximum resident size possible, because these programs are not aware of DESQview's presence.

DESQview 2.26 added a new option for keyboards in the DVSETUP program: "Maintain Separate Shift States." TSR users who set this option to "Yes" might discover that the shift keys (Ctrl, Alt, Shift) might "stick" after popping down from a TSR such as The SWAP Utilities. Rerunning DVSETUP and setting this option to "No" will solve this problem.

Running SWAP??

After installing your SWAP?? program on your disk drive, reboot your computer without loading the companion test program. Change to the directory where your program is located and type:

```
SWAP??
```

Remember that ?? represents the last two letters of the specific SWAP utility you are using. After typing this, you will see the SWAP utility's sign-on messages and your application will be loaded into memory. Immediately thereafter, you will see additional messages explaining what kind of memory was used for swapping and how much memory is really available, rather than what your program might have reported. Note that this memory value is in kilobytes of RAM (10K is 10,240 bytes, not 10,000).

The SWAP Utility memory report might differ from what is reported by your application. For ethical reasons, it is not possible to change the sign-on screen of your application to reflect the correct memory usage. The memory report you will see from your application is therefore pessimistic; the value that the SWAP utility displays is correct.

The sign-on screen also will tell you what kind of memory was used for the swapping: extended memory, expanded memory, or disk virtual memory. If for any reason the SWAP utility was unable to correctly swap out the application, a message will be displayed notifying you of that occurrence and both the SWAP utility and the application will be removed from memory.

You can load any or all of the SWAP Utilities sequentially into RAM at the same time or load each one as needed.

Once you've seen how the SWAP?? program operates, you will probably want to add it to your AUTOEXEC.BAT file and have it automatically load your program when you boot your computer. To do this, add the fol-

lowing line to your AUTOEXEC.BAT file, immediately before the line in the file that loads your application program:

```
SWAP?? /N
```

The /N option, described in more detail below, tells the SWAP utility that you will load the application program through a batch file and that the utility should not attempt to load it when you return to the DOS prompt.

Loading SWAP?? into "high" memory

If you have a hardware/software combination that allows you to load resident programs into "high" DOS memory (such as QEMM-386 or 386Max), then The SWAP Utilities can be loaded to take up no low DOS memory.

If your software uses a program such as LOADHI.COM or 386LOAD .COM, simply follow the syntax for loading SWAP?? into high memory. (Be sure to use the /N switch.) Then, load your application program into normal memory. SWAP?? will take care of removing your application from RAM.

The SWAP?? command line

The command syntax for SWAP?? programs is

```
SWAP?? [options]
```

where [*options*] represents one or more of the options listed below. Each of the options must be preceded by either a '-' or '/' as a switch character.

/H	Displays a help screen.
/N	When used in a batch file
/U	Removes both SWAP?? and its application from RAM.
/D*path*	Full pathname to store swap files on (if not enough EMS is present).
/S*x*	Sets type of swapping (0=Auto, 1=Disk, 2=EMM, 3=XMS) SwapType = 0 is the default. If selected type fails (i.e., no XMS is available with /S3), autocheck is done.
/G	Enables popping up over graphics modes.
/T*x*	Sets the pasting throttle (0=slow, 1=medium, 2=fast, 3=compat). The default is 2.
/P*x*	Paste buffers (0=minimum, 9=maximum). Each buffer uses 256 bytes).
/V*x*	Enables the special DESQview options.

For SWAPMT only:

/E	Special switch for Lotus Express users.

For SWAPEX only:

/P*xxx*	*xxx* is the number of minutes between automatic polling of MCIMAIL.
/A*y*	*y* is the letter of your Lotus Express Comm_Manager application.

To set the hotkey (see the section under setting the hotkey):

/A	Use Alt key for hotkey shift state.
/C	Use Ctrl key for hotkey shift state.
/L	Use the left Shift key for hotkey shift state.
/R	Use the right Shift key for hotkey shift state.
/K*xx*	Scan code for hotkey to use (see chart in documentation). Requires two HEX digits following the /K.

All utilities except SWAPTN automatically default to the hotkey combination that is normally used for application. SWAPTN defaults to Alt–J, because this combination is configurable only on the TN command line.

Details

The paragraphs below describe each of the command line options in detail.

/N If the /N switch is used, The SWAP utility will not automatically place the appropriate keystroke combination to load the application into the keyboard buffer when it goes resident. This option must be used when loading The SWAP Utilities from a batch file. After loading SWAP?? with the /N switch from within a batch file and loading the application, using the appropriate hotkey will call the application in the same fashion as if the application had been loaded from the DOS command line and was already resident.

/U Use this option to cleanly remove SWAP?? and your application from RAM. If disk swapping is in use, the swap files will be deleted before freeing memory. If the application also uses expanded memory, the expanded memory will be freed as well. If the application uses disk-based swap files (such as those SideKick Plus uses), they will not be deleted.

In general, you should not attempt to use a particular applications "unload" or "remove from memory" feature. The feature won't work and probably will crash your machine. Use the /U feature of the SWAP utility instead.

/S*x* The /S parameter determines the type of swapping to use. In the default Autodetect mode, the SWAP utility will attempt to allocate expanded memory using EMS version level 3.2 or later. If EMS is not avail-

able, the utility will attempt to use Extended Memory that is available using Microsoft's eXtended Memory Specification (XMS) (see note about XMS below).

If neither EMS or XMS is available, two swap files will be created and SWAP?? will use the disk (C:\ is the default) for swapping. The /S parameter can be used to override the default mode and force swapping to XMS, EMS, or disk. If the swapping method specified with /S is not valid, then Auto mode is used. Note that the third swap file (SWAP??.SW3) is created in the path specified by the /D parameter or the TEMP environment variable, no matter what swapping method is chosen.

/G Because there are so many video adapters and no standard way to deal with popping up TSRs over various graphics modes, The SWAP Utilities, by default, inhibit popping up over graphics modes. An exception to this rule is Microsoft Word. The SWAP Utilities will always pop up over MS Word (see note about Microsoft Word below) on systems with standard graphics adapters. Many TSR applications, however, have built-in support for graphics modes, so using the /G switch will enable the application to pop up, if possible.

You should avoid popping up SWAP Utilities over graphics modes. No resident program can guarantee that it will be safe to use over all graphics modes and on all graphics adapters. There are just too many possibilities, combinations, incompatibilities, etc. That is why The SWAP Utilities default is not to pop up over graphics modes.

/D*path* The /D parameter tells The SWAP utility in what drive and directory to store the swap files. The default is the root directory on drive C: (C:\). The pathname is limited to 30 characters and must contain a valid drive specification and path. The trailing backslash is not necessary. If the /D parameter is not the last option on the command line, there must be a space character following the pathname and before another slash option.

Note that at least one disk-based swap file always will be created on this path. An example path is: /DC:\TEMP

/T*x* This option can be used to "throttle" down the pasting speed of the SWAP utility you are using. Some applications, such as the Norton Editor, cannot handle characters as fast as SWAP?? can feed them, requiring that a slower speed be used. The valid values here are 0, 1, 2, with 0 being the slowest and 2 the fastest. The /T3 switch is for "compatibility" mode. Use this switch if you are using a program that relocates the BIOS keyboard buffer or expands the keyboard type-ahead buffer. This switch is the slowest option, but pasting will work in all cases. The default is /T2.

/P*x* This option can be used to reduce the "bounce" or "hiccup" associated with pasting large blocks of text into an application. The default value of 0 gives a 128-byte internal buffer, which is enough room for SWAP?? to paste 64 characters before "hiccuping" back to the application to get more

keys. The maximum value of /P9 will allow you to have more than 1,000 additional characters stored in the internal buffer, at the cost of more than 2K of additional RAM.

Setting the hotkey

The SWAP Utilities allow the use of more hotkeys than most applications do. For example, to replace the application's normal hotkey with the F11 key, add /K57 to the SWAP?? command line. Notice that the hexadecimal number 57 is the scan code for the F11 key. See the appendix for a listing of the keyboard scan codes. To use Ctrl – Left Shift – Q as the hotkey combination, add /C /L /K10 to the SWAP?? command line. The command line examples below further illustrate how to set the hotkeys.

Examples

```
SWAPSP /K58 /T1 /S1 /DE:\
```

This command would load SWAPSP, swapping to the root directory of drive E:, using a hotkey of F12 and a medium paste speed.

```
SWAPMT/1/a/k25/df:\SWAPPATH
```

This command would load SWAPMT, swapping to EMS if available, otherwise to F:\SWAPPATH, with a hotkey of Left Shift – Alt – K.

```
SWAPTN /dD:\ /A/k14/S1
```

This command would load SWAPTN, swapping to D:\, with a hotkey of Alt – T.

How The SWAP Utilities use memory

The SWAP Utilities are designed to use your system's resources as efficiently as possible. It is most efficient to swap to expanded (EMS) memory, rather than to use extended memory or a virtual disk. Because EMS is treated as a part of the computer's "real-mode" address space, the SWAP?? programs can read and write a single memory location in one fast loop.

Unless you specify which type of memory to use via the /S command line option, SWAP?? will first attempt to allocate enough EMS for swapping. If that fails, XMS will be used. Finally, disk-based files will be created in the swapping drive/directory.

Expanded memory When using EMS for swapping, the total amount of EMS required is the resident size of your application plus its environment area, rounded up to the nearest 16K boundary.

Note: A 4,096-byte disk file with the extension .SW3 always will be created in your swapping path. This file is required for correct operation of

The SWAP Utilities and is created even if you are using EMS or XMS for swapping.

Extended memory To use extended memory with The SWAP Utilities, you must use a driver that supports Microsoft's eXtended Memory Specification (XMS) Version 2.0, such as Microsoft's HIMEM.SYS. The current versions of 386MAX and QEMM both support XMS on 386 machines. The latest official XMS driver can be obtained for free from Microsoft, either through their CompuServe Forum (GO MSSYS) or by calling Microsoft customer service at (800) 426-9400 and asking for a copy of the XMS Specification and its supplemental diskette.

If your computer supports both XMS and EMS, EMS memory is the preferred choice. Using XMS requires almost twice the amount of memory.

Disk virtual memory The third possibility is to swap to a disk drive. If your computer has extended memory, you can use either XMS or a virtual disk for swapping. The memory usage is virtually the same in either case, although XMS swapping is marginally faster (only fractions of a second on 286 machines, so it's nothing to worry about).

General notes for all utilities

If you are swapping to a disk, two swap files are created in the specified drive and directory. A third swap file is created no matter what swapping method you have selected. These swap files must not be deleted while the SWAP utility is loaded. Doing so will cause your machine to crash if you attempt to pop up.

You must load The SWAP Utilities after you load all network drivers, disk cache programs, and other programs that require background processing or hook the device driver chain. Other than these exceptions, load order is not important. You can load The SWAP Utilities at any point, early or late in your TSR order. You also can load The SWAP Utilities in "high" DOS memory with 386Max, QEMM, or other similar programs.

You can safely load a SWAP utility inside a Software Carousel partition, or as a global SC utility. You might have a period when your screen is blank when attempting to swap partitions after having used a SWAP utility. Be patient; the partition will change normally.

When pasting large blocks into an application, you will occasionally see a "hiccup" with the SWAP message on the display. This condition is caused by swapping your application in and out to read the next set of keys. Most applications support virtually unlimited paste buffers, and the memory used by The SWAP Utilities is limited.

You should not attempt to use a particular application's "unload" or "remove from memory" feature. It won't work and probably will crash your machine. Use the /U feature of the SWAP utility instead.

When creating swap files for disk-based swapping, The SWAP Utilities default to the root directory of Drive C:. If you create an environment string

called TEMP with the SET command, the utilities will instead default to the directory specified by that command, and the use of /D will not be necessary.

An example of setting an environment string would be:

```
SET TEMP=G:\
```

where G is a fast RAM disk. This string would cause disk swapping to take place in the root directory of Drive G:. The environment variable TEMP must be set prior to loading your SWAP utility. The programs will attempt to swap in the following sequence:

1. To EMS
2. To the specified path if /D specified
3. To the path specified by the environment variable named "TEMP"
4. To the root directory of Drive C:
5. Abort and remove both the application and the SWAP utility from memory.

A note for Microsoft Word users

When using The SWAP Utilities with Microsoft Word, you should not use the /G switch, even if you plan to use Word in graphics modes. The SWAP Utilities automatically detect the presence of MS Word 4.0 and 5.0 and will switch between text and graphics modes as needed. This switch works on CGA, EGA, VGA, and Hercules systems with Word 4.0, except in Hercules 90×43 mode.

Word 5.0 users who work in the graphics mode will need to do an extra bit of setup. In order for the switch between text and graphics to work, you must set both text and graphic display modes in the Word 5.0 Options menu.

Load Word 5.0 and bring up the Options menu. Select the appropriate text display mode for your system. Return immediately to the Options menu and select the graphics display mode you wish to work in. Test the results by pressing Alt–F9, to toggle between text and graphics modes. Exit from Word, and you're all set.

A note for using SWAPSK

The Calculator Paste does not work with SWAPSK. However, Calculator Paste will work when SideKick is popped up, so you can paste from the calculator into the notepad, and then paste from the notepad into your application.

Notes for using SWAPSP

Background communication must be disabled to use SWAPSP. If you're using Super PC-Kwik in EMS, do not use the /Q+ parameter. Returning

quickly to the DOS prompt will cause problems with SWAPSP.

If you change the Services menu text for "Paste from Clipboard" or "Screen to Clipboard," TESTSP will not be able to locate the addresses it needs. These two options must be set to their factory defaults in order for TESTSP and SWAPSP to run.

The Ctrl-Center key works as the default "Display Dial" shortcut key. However, TESTSP is unable to detect that this key has been changed as a shortcut key, so to use this feature, you must use the default key.

Notes for using SWAPTN

You will not be able to load Tornado using the "repeat" option. If you do not use the /N switch, SWAPTN will load Tornado as "TN 99" to allow you the maximum "pile" size. There is no cost in "real" RAM, so we recommend you load TN that way yourself if you are loading it in a batch file.

Notes for using SWAPMT

Some users have found keyboard compatibility problems when using MetroKernal 1.0. If you have conflicts of this type, you should contact Lotus Development Corp. for an upgrade.

If you load Metro in a batch file that loads multiple utilities (such as the EXPRESS.BAT file that is created), you must add the following lines to the batch file to correctly swap out the entire application. At the beginning of the batch file, before the call to Metro, add:

```
SWAPMT /N /E [and any other command line switches you want]
```

At the end of the batch file, after loading everything, add:

```
SWAPEX
```

This command will ensure that all the Metro applications are correctly swapped.

SWAPEX.COM has two command line switches:

/P*xxx*	*xxx* is the number of minutes between automatic polling of MCIMAIL.
/A*y*	*y* is the letter of your Lotus Express Comm_Manager application.

For example, if you load:

```
SWAPEX /P60 /AX
```

This command tells SWAPMT to poll MCIMAIL every hour and that Express is "X" on the Metro menu. Approximately one minute after loading SWAPMT, Express will be popped up and be given the command to manually poll MCIMAIL.

This automatic polling will not occur if the underlying application is a communications program and if communications interrupts are "hot." If this situation occurs, SWAPMT will attempt to pop up at 10-second intervals, waiting for the communications program to finish.

Also, if a key has been hit within 10 seconds of the scheduled pop up time, SWAPMT will not pop up. It will attempt to pop up at 10-second intervals to prevent an unwanted pop up while you're typing in another program.

Any background processing will not take place as scheduled. You must pop up Metro first, including Express.

Alt – Shift – Enter works as a paste key. All keyboard macros in the currently loaded macro file are operational at the DOS prompt.

Use S_RUNKM.COM instead of RUNKM.EXE to run macros from a batch file. Use S_LOADKM.COM instead of LOADMAC.EXE to run macros from a batch file. The syntax for these programs is the same as their Metro counterparts.

Notes for using SWAPSH

Do not use PC-CACHE.SYS with SWAPSH, unless you actually have a Bernoulli Box installed. PC-CACHE.COM works fine.

You must add the PC Shell's /R switch to the command line when loading the program in a batch file. Without the /R switch, the program loads but does not go resident.

You now can execute programs when PCED is active or when using 4DOS. You still must be at the command line, but SWAPSH will detect the command line with these additional environments.

PCRUN.COM must be in your PATH in order to execute programs correctly.

The SWAP Utilities can swap memory in and out faster than Shell. Therefore, if you do not use the /N switch, SWAPSH will load Shell with the /RLARGE parameter, forcing Shell to use as much memory as possible.

Notes for using SWAPDT

You must add PC Desktop's /R switch to the command line when loading the program in a batch file. Without the /R switch, the program loads but does not go resident.

Alarms are fully functional. Keyboard macros work both inside DT as well as inside your applications.

A note for using SWAPMM

You must add MemoryMate's /R switch to the command line when loading the program in a batch file. Without the /R switch, the program loads but does not go resident.

Application versions supported by The SWAP Utilities

The following versions of the applications are known to work with the SWAP?? programs. Earlier versions might work, but they are not supported. If a new version of your program comes out that is not listed here, Innovative Data Concepts request that you contact them directly.

SideKick: Versions of 1.52A through 1.58B.
SideKick Plus: All versions shipped as of 4/1/90
Tornado: Versions 1.70 through 1.80
Memory Mate: Versions 3.01 and 3.02
PCTools: Versions 5.5 and 6.0
Norton Guides: All Versions shipped as of 4/1/90
Metro/Express: MetroKernal 1.0, 1.1, and 1.11.

If something goes wrong

If you have a problem loading your SWAP?? program, it will normally issue an error message with an attempt to describe the problem. If you encounter an error message, please check the section titled "Error Message Descriptions." Most message descriptions include a probable cause to help you to quickly identify the problem.

If, however, your SWAP?? program will not load correctly or crashes when you try to access the application, there might be a conflict with your system. Try the following steps to help us identify the problem:

- ☐ Check to make sure that TEST?? has been run and did not abort.
- ☐ Check the version number of the program you are using against the section, "Supported Versions."
- ☐ Make sure you are using the /N option if you're loading SWAP?? through a batch file or a shell program's autoload feature.
- ☐ Use the /S1 option to force SWAP?? to write to disk. If this solves the problem, the conflict might be with your expanded memory manager or with other parts of your hardware.
- ☐ Rename your AUTOEXEC.BAT and CONFIG.SYS files, reboot your computer, and try to recreate the problem. If the problem does not occur during this test, then there is probably a conflict between SWAP?? and a TSR (terminate and stay resident program) loaded by your AUTOEXEC.BAT or a device driver loaded in your CONFIG.SYS. To determine which one is causing the conflict, reintroduce the commands in your AUTOEXEC.BAT and CONFIG.SYS one at a time and reboot and rerun SWAP?? after each change until the problem occurs. This procedure should pinpoint the conflicting program. Sometimes rearranging the order that TSRs are loaded will eliminate the conflict.

Common questions and answers

Why should I use SWAP?? The most obvious answer would be to save memory. The SWAP?? programs, however, have additional benefits. You can load your TSR into high DOS memory, if available. You generally have a greater choice of hotkeys to use. The SWAP?? swapping routines usually are faster than the swapping used by the applications. Plus, because the SWAP?? programs support the TesSeRact Standard for TSR Communication, there are documented ways to access them, a feature that is not available without the SWAP?? programs.

How often do I run TEST?? You should run TEST?? the first time you install a new version of the SWAP?? program. TEST?? writes information into the .COM file that describes the exact copy of your application.

The only time you should need to rerun TEST?? is if you change the configuration of the program: give it new hotkeys, change the memory allocation, rebuild the executable (as with SK+), etc.

When do I need to run TESTDV? TESTDV is used to determine the run-time parameters of your DESQview environment. TESTDV must be rerun if you add an additional TSR to be loaded before DV, if you add a network, or even if you add a new device driver. All can affect the way DV configures itself for your machine.

What is the optimal load order for the various SWAP?? programs? If you use more than one SWAP?? program, you should load them in reverse order of most common use. If you want to pop up one SWAP?? over another, you'll need to load the last program to pop up first. For example, you should load SWAPSH, followed by SWAPDT. This order will permit you to bring up PCShell from the Desktop menu.

Error message descriptions

Invalid command line parameter! Please check your documentation!! The most frequent cause for this message is not adding the appropriate numeric parameters to a command line option (such as `/T3`).

Not enough free space on selected swap drive This message is followed by the drive letter of your current swapping drive. There is currently not enough free space on the drive to successfully swap out your application. Use the `/D` command line parameter or modify the `TEMP` environment variable to fix this problem.

SWAP?? already installed This message is issued if you attempt to load a SWAP?? program a second time. It also might appear if you attempt to load your application program a second time, if it has already been swapped.

SWAP?? has successfully loaded . . . .

Swapping to . . . . These messages are issued by SWAP?? after successful loading of your application program and indicate the name of the

program you are swapping, as well as the type of memory being used.

SWAP?? is not installed! Please run TEST??! You must run TEST?? before you can load SWAP??

SWAP?? is not loaded—cannot be removed You cannot remove SWAP?? from memory when it is not installed.

SWAP?? installed This message is given when the SWAP?? program installs and "goes resident," but before the application program is loaded.

SWAP?? removed from memory When you load SWAP?? with the /U switch, you'll get this message. Note that this does not mean that the SWAP?? program is immediately released. If another TSR has been loaded after SWAP??, the TSR might be using the same interrupt vectors, which will keep SWAP?? from successfully removing itself. As soon as the second TSR is removed, SWAP?? will disappear. You also will be unable to access SWAP?? during this time.

Unable to access selected swap drive: This message is followed by the drive letter of your current swapping drive. The most likely cause for this message is that the specified drive does not exist. Use the /D command line parameter or modify the TEMP environment variable to fix this problem.

Unable to autodetect memory for swapping This is a serious error message that should never occur. It means that SWAP?? was unable to determine what kind of memory should be used for swapping.

Unable to load SWAP??—Bad swap filename: This message is given when SWAP?? could not create a swap file with the specified pathname. A possible reason is that a swap file with that name already exists and is read-only.

Error accessing XMS memory
Error accessing EMS memory
Error accessing disk-based swapping files Contact IDC immediately if you receive one of these messages.

Registration

Upon receipt of the appropriate registration fee, Innovative Data Concepts will send the user a printed copy of this documentation, a disk containing a version of SWAPDOS without the shareware registration screen, and a registration number entitling the user to upgrades and telephone support. Registered users will also be given a toll-free number that will permit them to receive a free CompuServe Intro-Pak, along with a $15 usage credit.

At the present time, customized versions of The SWAP Utilities ship with GOfer 2.0, from MicroLytics, Inc., and Info Select, from Micro Logic Corp. Other companies are interested in similar arrangements, and IDC

will keep its users posted about future developments.

To order one or more of The SWAP Utilities and receive a copy that does not contain the shareware notice when the program loads, printed documentation, and upgrade notification, write to:

Innovative Data Concepts
1657 The Fairways, Suite 101
Jenkintown, PA 19046

The prices for The SWAP Utilities are as follows:

Any single SWAP?? program	$25
Any two SWAP?? programs	$45
Any four SWAP?? programs	$80
All eight SWAP?? programs	$100

2
Disk utilities

There are perhaps thousands of shareware programs that could fall under the category of disk utilities. The two programs in this chapter address two of the major limitations we all eventually run into: disk access speed and disk capacity. Like anything else related to computers, we are never satisfied with how fast it is or how much it can hold.

PC-KWIK helps alleviate the problem of disk access speed. It takes a portion of your RAM and sets up a cache to store the most recently accessed disk sectors. The result can be a dramatic increase in performance of programs that constantly access the same files. Not only does this increase speed, but it also helps reduce wear and tear on your disk drives.

File compression generally is referred to as archiving, because the compressed files take up less space on disk, making them more convenient for storage. Another important use for file compression is transmitting files via modem. Files in their compressed form transmit across the phone lines much faster, saving both time and money. Once a compressed file is received through a modem, it can be "uncompressed" and used normally. While many file compression programs exist, PKZIP is widely considered the standard. Most electronic bulletin board services (BBS) store files in compressed form, usually in the PKZIP format. If you want to access a BBS to upload and download files, you'll need the PKZIP programs.

PC-KWIK (Disk 1037)

Special requirements PC-KWIK requires a minimum 392K of available RAM. PC-KWIK is compatible with DOS 2.0 through 3.3. It does not, however, support cartridge disks.

PC-KWIK speeds up applications that constantly access disk drives, especially when accessing floppy disks. Many applications, database programs for example, open files on a disk. As the files are changed, sorted, and so on, the application continuously reads and writes at the same places on the disk. The constant disk access slows the application down. An excellent solution to this problem is to set up a disk cache using PC-KWIK.

A disk cache is a place in RAM that is set aside to store data that is being read from and written to the disk. Instead of accessing the disk, the application program accesses the cache. Because RAM access is extremely fast compared to disk access, the results can be dramatic.

Using PC-KWIK

The shareware version of PC-KWIK, called SHAREPCK, is simple to run, mostly because there are no options available with it. To run it, simply type the following at the DOS prompt

```
SHAREPCK
```

Before SHAREPCK loads itself into memory, you will be forced to page through several screens of instruction/advertisement that are mostly intended to convince you to purchase one of the commercial versions of PC-KWIK. The screens really don't get in the way too much, but they do make SHAREPCK inappropriate for use in batch files.

Details

SHAREPCK loads itself into memory as a terminate and stay resident (TSR) program. It automatically allocates memory for itself, leaving 360K bytes for your applications. In other words, it takes up the memory over 360K that is not used by DOS or your other memory-resident programs.

```
                    TM
Shareware PC-Kwik   Disk Accelerator, Version 2.19
      Copyright 1986, 1988 Multisoft Corporation

          Measurements are as follows:
              533 logical transfers.
              468 physical transfers.
               65 transfers saved.
               12 percent saved.


C:\>
```

2-1 PC-KWIK will display a performance report like this example when you run it after it has been installed.

As a result, its resident size in memory is fixed by the total amount you have available.

As you use your application program, SHAREPCK keeps track of the most recent sectors accessed and it saves them in RAM. With a copy of recently-used disk sectors in RAM, PC-KWIK reduces the number of times the application program needs to read the disk. Because of the way the program keeps track of disk transfers, the longer you use it in any one session, the greater the performance benefit.

At any time after you've loaded SHAREPCK into memory, you can run it again at the DOS prompt to see how well it is performing. When you do, you'll see a screen like that shown in FIG. 2-1, reporting the number of disk transfers and how many of them were saved. SHAREPCK does not provide any way to remove itself from memory.

Registration

To register the shareware version of PC-KWIK, send $19.95 to:

Multisoft Corporation
15100 S.W. Koll Pkwy, Suite L
Beaverton, OR 97006
(503) 644-5644

In doing so, you will receive a copy of the latest shareware version of PC-KWIK along with notification of future updates. Instead of registering the shareware version, you are encouraged to order one of the commercial versions of PC-KWIK. The commercial versions work the same way, but they offer some additional features, such as allowing you to specify the cache size and letting you remove the cache from memory without rebooting. The commercial versions also allow you to set up the cache in Lotus/Intel/Microsoft expanded memory or AT extended memory if you have it. They also cost more. For more information, contact Multisoft Corporation.

PKZIP (Disk 1364)

Special requirements

- ☐ MS-DOS version 2.0 or higher.
- ☐ PKZIP requires a minimum of 85K memory to run.
- ☐ PKUNZIP requires a minimum of 70K of free memory to run.
- ☐ The maximum number of files that PKZIP can compress into a single ZIP file is 3,900.

The term "compression" means to reduce in size. Computer file compression refers to reducing files in size, so they take up less storage space on disk. PKZIP will perform this reducing process quickly and easily. The compressed files are then stored in a special file called a ZIP file.

ZIP files have three distinct benefits:

- They use less disk space than normal files. Storing files in compressed form increases the life and storage availability of your expensive hard disk.
- Many individual files can be compressed into a single ZIP file, making file group identification, copying, and transporting faster and easier.
- Compressed files travel faster via modem, which reduces telecommunication transmission and reception time. Many BBS (computer bulletin board services) use PKWARE files as their standard. The compression enables the BBS to store more files and enables you to transfer files faster and more easily.

The following programs make up the PKWARE software

PKZIP.EXE	Main compression program.
PKUNZIP.EXE	Main extraction program.
ZIP2EXE.EXE	Used in creating self-extracting files, which are executable files referred to as PKSFX.EXE, although they can have any name.
MAKESFX.COM	Starts the process of creating self-extracting files.
PKZIPFIX.EXE	Reconstructs corrupted ZIP files.

The two main programs: PKZIP and PKUNZIP

PKZIP is the program that compresses files. This shrinking process often is referred to as data compression. Terms you will see during the compressing process are "storing," "shrinking," and "imploding." PKZIP also handles all file maintenance including adding and deleting files, as well as reporting on technical information from within the compressed file.

PKUNZIP is the program that uncompresses or extracts compressed files. In addition to extracting a complete ZIP file, it can selectively release individual files, show files on the screen for fast viewing, or print them out on a printer.

Latest PKWARE features

The following features are available with the PKWARE compression programs.

- PKZIP implements a new compression algorithm called Imploding, which averages 5 to 15% better compression than the maximal compression of previous versions of PKZIP. Imploding also is faster at compressing and extracting than Reducing was.
- Sensitive data files can be scrambled with password protection.
- PKZIP and PKUNZIP test for the presence of an 80386 CPU. If one

is present, PKZIP and PKUNZIP will use the 80386's 32-bit instructions and extended addressing modes for improved performance.

- Special file handling capabilities will automatically recurse through subdirectories and store pathnames within a ZIP file. These paths then can be created on extraction if they do not already exist.
- Extra compression options allow you to specify the method of compression (Shrinking or Imploding) to be employed.
- A file that has been created as a self-extracting file can be treated as a normal ZIP file. All PKZIP and PKUNZIP options (except -v, View) will be valid.
- Files contained in a ZIP file can be viewed in several different ways. For example, they can be sorted by: compression ratio, size, date, name, or extension.
- A new option, -x, can be used to specify files to be excluded from any ZIP operation being performed.
- Special file attributes (hidden, read-only, system) can be masked during creation or extraction of a ZIP file. PKZIP also can be configured to include or not include hidden and system files.
- ANSI comments can be enabled or disabled.
- Expanded configuration file options are available.
- Individual file comments (up to 60 characters in length) can be programmed for each file in the ZIP file.

Some file compression terms

In order to fully understand the next sections, it's probably a good idea to define some of the terms.

A *ZIP file* is the file that holds file information that has been reduced in size for better storage. It is sometimes called a compressed file or a library file. A ZIP file can be made up of one or more files compressed and stored together under one filename. For example, a ZIP file called MANUAL.ZIP might contain the files CHAP1.TXT, TOC.TXT, APP.TXT, and COV.TXT. In another example, a ZIP file called BIG.ZIP might contain only one file, HUGE.WKS, a large worksheet that has been shrunk in size for better storage and faster telecommunications.

File compression is the process of reducing a file's size. It is sometimes referred to as data compressing.

File extraction is the process of recreating files that have been previously compressed.

ZIP file size limitations

The practical size of a ZIP file is primarily limited by the amount of free disk space you have available. Consequently, PKWARE works best on a hard disk system.

Even though you are making files smaller, the process used to shrink them can briefly double the storage space needed. When a ZIP file is being modified (e.g., files being added), the process creates a new ZIP file that will be used as a replacement for the old version. Both the old and the new versions will be on your disk at the same time until just prior to the completion of the process.

When you extract a ZIP file, the amount of space needed to hold that file can double. A large hard disk drive normally ensures that enough storage area is available.

Compressed files are often stored on floppy disks. The limit to floppy storage is the number of characters your floppy system will hold:

Standard double-density floppy 360K
High density floppy 1.2 Mb
3-1/2" floppy .7 or 1.4 Mb

You might have problems adding files to a ZIP file stored on a floppy disk or extracting files to a floppy disk system when the number of characters in the ZIP file is more than 50% of the available storage space on the floppy disk.

For example, consider a standard floppy disk system with 360K of storage space with a ZIP file, BIGFILE.ZIP, stored on it, that is 250K in size. In order to add files to BIGFILE.ZIP, you need 500K of disk space. The extra space is used to hold a new updated ZIP file created before the old ZIP file is deleted. When BIGFILE.ZIP is extracted, it might require 400K of space, but remember that the available space on the disk restricts it to 360K.

There are a number of ways to avoid the limitations. A thorough knowledge of PKWARE Programs will show you how to:

- Selectively extract files from a ZIP file. Instead of extracting everything at once, you can view file size information and then select specific files to be extracted to a floppy.
- If you have two floppy drives, create the ZIP file on your second disk drive, so you have the full 360K available to you.
- Use the special -b command option, which routes the new file to an alternate disk drive during the compressing process and copies it back to the floppy disk upon completion.

Using PKZIP

Use PKZIP to reduce or compress the size of your files. All compressed files are stored in a ZIP file while in their compressed state. The original

files are not disturbed. PKZIP is used as a command at the DOS prompt. The command syntax is as follows:

PKZIP [-b[*path*]] [*options*] *zipfile* [*files...*] [*@list*]

where the command line options are:

zipfile	ZIP filename. The default extension is .ZIP.
files...	Names of the files to compress. Wildcard characters, * and ?, can be used. The default is all files.
list	An optional list of the filenames.
-a	Adds files to ZIP file.
-b[*path*]	Creates a temporary ZIP file at the specified alternate location. This temporary file is used only in the creation of the ZIP file and will be deleted automatically when the process is complete.
-c -C	Adds file comments to individual files within the ZIP file.
-d	Deletes the specified files from the ZIP file.
-e[x,s,a,b]	Specifies compression method.
-f	Freshens files in the ZIP file.
-h	Calls up a help screen.
-i	Adds to the ZIP file only those files that were changed since the ZIP file was last updated.
-j [h,r,s] -J [h,r,s]	Specifies masking or unmasking of file attributes.
-k	Retains the original date of the ZIP file that is being updated.
-l	Displays the license screen.
-m[u,f]	Adds files to the ZIP file and automatically deletes the original or source files.
-o	Sets time and date of the ZIP file to the time and date of the latest file contained in the ZIP file.
-p -P	Stores paths that are recursed along with the filenames in the ZIP file. The -p option should be used with -r option.
-q	Enables ANSI comments.
-r	Recurses subdirectories from the specified directories.
-s *password*	Scrambles files in the ZIP file with password protection.
-u	Updates the ZIP file.

-v[b,r,t,c, d,e,n,o,p,s]	Views technical information about files in the ZIP file.
-w[h,s]	Specifies whether hidden or system files will be included
-W[h,s]	in the ZIP file.
-x	Is used to exclude files from a ZIP file operation.
-z	Creates a ZIP comment for a ZIP file.

PKZIP examples

Here are some examples to show you how PKZIP is used as a command. The command line options are explained in greater detail in the next section.

```
C:> PKZIP -a A:NEWFILE *.*
```

This command will create a file named NEWFILE.ZIP. The .ZIP extension will be added automatically when the ZIP file has been completed. In this example, all of the files in the current directory will be compressed into NEWFILE.ZIP.

```
C:> PKZIP -a B:BUDGET \LOTUS\CHECKS.WKS
\LOTUS\MONEY.WKS
```

This command will create a ZIP file named BUDGET.ZIP on the B drive. It will contain two files, both currently located in the \LOTUS directory.

```
C:> PKZIP -f FILES *.TXT
```

This command will update an existing ZIP file named FILES.ZIP. The files with a .TXT extension that already exist in the ZIP file, and that are also dated later than those already within FILES.ZIP, will be updated.

PKZIP details

The commands used in creating a ZIP file will be explained in detail in this section. If you're used to older versions of PKZIP, you'll find that the new command format is much more flexible and easier to use. Listed below is a summary of important facts to keep in mind while using PKZIP.

- The command options generally can be placed anywhere on the command line.
- The first filename listed on the command line will be interpreted as the ZIP file.
- The commands usually can be typed using either uppercase or lowercase, with the following exceptions:
  W w Include special files

J j Mask special files
C c Create comments
P p Store pathnames

In general, you should use lowercase for all commands that are not case sensitive in order to be compatible with future versions of PKZIP.

- All command options for the software must be preceded by a - (hyphen) character or the MS-DOS switch character (usually /, the slash).
- Most options, except where noted, can be combined (i.e., -x -y or -xy).

The default values for the command line are as follows:

- If no options are entered, the default is -a, the add file option.
- If no extension is specified for the ZIP file, the .ZIP extension will be used.
- If no location is listed for the ZIP file, it will be located in the current directory.
- If no file specs (filenames, with or without wildcards) are listed, the default is *.* (unless the -d option is being used).

The command options are explained below in groups determined by function. The options pertaining to adding or updating ZIP files are explained first, followed by the delete option, view options, configuration options, and miscellaneous options.

-a Add files to a ZIP file. This command will add files to either a newly created or an existing ZIP file. Duplicated filenames will overwrite those already in the ZIP file, regardless of which has the latest date. -a is the default option if no other options are specified.

```
A:>PKZIP -a TEXT CHAP1.DOC CHAP2.DOC TOC.DOC
```

Once the program is finished creating a new ZIP file containing the three files listed above, the extension .ZIP will be added to the file, TEXT, making it TEXT.ZIP.

-u Update existing ZIP file. The existing ZIP file will be updated with files only if they are not currently in the ZIP file or if they are dated later than those with the same name already in the ZIP file.

Although this command is similar to the -a (Add) command, it has an update safeguard. It will overwrite existing compressed files only if the selected files have a more recent time and date.

```
C:>PKZIP -u OLDFILE.ZIP *.TXT MONEY.WKS A:FUNDS.WKS
```

This example will update the ZIP file named OLDFILE.ZIP. The files listed

above will be updated within the ZIP file. They will be added if they do not already exist or will be overwritten if they already exist in the ZIP file with an earlier date.

`-f` Freshen files in ZIP file. This option updates files that already exist in the ZIP file with duplicate filenames with later times and dates.

The freshen option is limited to working with files that already exist in the ZIP file. Existing zipped files will be overwritten only if the files have been updated since being added to the ZIP file. It will not add new files.

```
C:>PKZIP -f STORE.ZIP *.*
```

In the above example, all the existing files in the ZIP file, STORE, will be updated if a newer version of the file exists in the current directory.

`-i` Selectively BACKUP files. This option will add only those files to the ZIP file that were not backed up the last time or that have been changed. If the program returns the notation "No files found," everything has been previously backed up.

```
C:\PKWARE> PKZIP -i ALLFILES.ZIP
```

In this example, all the files in the ZIP file, ALLFILES, will be backed up that had not been previously.

`-m[u,f]` Move files into a ZIP file. This option will add files to a new or existing ZIP file and automatically delete the original or source file. There are two additional options available with the Move option: Move Update and Move Freshen.

When used alone, the `-m` option is similar to the `-a` (Add) command option, except that `-m` automatically deletes the original files. This option is a real time saver, for example, when compressing an entire directory. The `-m` option compresses all your files into a single ZIP file, then deletes the original files.

`-mu` This option specifies the Move option used alone with the Update option. When these two options are used together, the existing ZIP file will be updated with files only if they are not currently in the ZIP file or if they are dated later than those with the same name already in the ZIP file. After the ZIP file is updated, the original files will be deleted.

`-mf` This option specifies the Move option used along with the Freshen option. When these two options are used together, files already existing in the ZIP file will be updated with duplicate filenames with later times and dates. After the ZIP file is updated, the original files will be deleted.

The original files are deleted after the program verifies the ZIP file for accuracy. If an error does occur, such as "Disk full," the original files will not be deleted.

```
C:\DB> PKZIP -m TINY.ZIP *.DBF
```

In this example, all the database files will be compressed into TINY.ZIP and then will be erased from the \DB directory.

`-d` Delete files from within a ZIP file. This option is used to delete single or multiple files within a ZIP file. Any of the MS-DOS file handling descriptions can be used. The name of the file will be displayed on the screen as it is being deleted.

```
C:> PKZIP -d OLDFILE.ZIP GARBAGE.TXT USELESS.DBF
```

In this example, GARBAGE.TXT and USELESS.DBF will be deleted from the files in OldFile.ZIP.

`-v[b,r,t] [c,d,e,n,o,p,s]` View technical information. This option will display technical information concerning the files contained within a ZIP file. There are several options available with the View option. All are explained below. The options determine how the information will be displayed and sorted.

The following information about each file contained in the ZIP file will be displayed on the screen.

Length	Original length of the file
Method	Type of file compression used
Size	Size of the compressed file
Ratio	Percent reduction in file size
Date	Actual date of the file
Time	Actual time of the file
CRC-32	The CRC-32 value of the file
Attribute	The attribute of the file (s=System, h=Hidden, w=Writable, r=read-only file, and *=encrypted)
Name	Name of the file

The View options for PKZIP are explained below. The options determine how the information will be displayed and sorted on the screen. The following display options are available:

`-vb` The `-b` (Brief display) option will display all the information shown above, except the CRC-32 value and the file attribute.

`-vt` The `-t` (Additional Technical display) option is used to display extra technical information. When this option is active, the following information will be displayed on the screen. With this display, the following information about each file in the ZIP file will be displayed on the screen.

The following information will be displayed for each file in the ZIP file, when the `-vt` option is used:

Filename	Name of the file

File type	Type of file
Encrypted	It will be noted here if the file is encrypted
Attribute	The attribute of the file (s=System, h=Hidden, w=Writable, and r=read-only file)
Comments	File comment, if present, will be listed here
Date and time	Date and time of the ZIP file
Compression method	Imploding or Shrinking (or Reducing, if an earlier of PKZIP was used)
Compressed size	Reduced or compressed size of the file
Uncompressed size	Original length of the file
CRC-32	The numeric CRC-32 value
Created by	The version of PKZIP and the operating system used to create the ZIP file
Needed to extract	The version of PKZIP required to extract the files

`-vc` This option is used to display any existing file comments.

`-vr` Display information in reverse order from the default order. This option can be used with any of the other View options to reverse the order of sorting.

Any of the display options explained above can be used with the sorting options listed below.

The following sorting options are available with the View option. The default order of sorting also is specified. (This order can be reversed by using the particular sorting option along with the `-vr` or View Reverse option.)

`-vc` Sort by date of files, oldest to most recent.

`-ve` Sort by file extension, alphabetically.

`-vn` Sort by name of files, alphabetically.

`-vo` Display in original order, i.e., the order in which the files were zipped. (This option can be used to override any configuration parameter you might have set.)

`-vp` Sort by percentage ratio of compression, smallest to largest.

`-vs` Sort by size of files, smallest to largest.

If no sorting option is specified, the files will be displayed in the order they were compressed.

The following example illustrates the command used to display the technical information about a ZIP file sorted by date. The output is shown

```
Length  Method   Size  Ratio   Date    Time   CRC-32  Attr  Name
------  ------   ----- -----   ----    ----   ------  ----  ----
  6144  Implode   2228  64%  01-04-80 13:52  a1f719af  --w  SAVE.DOC
  7168  Implode   2305  68%  01-04-80 14:58  fc970ad9  --w  EWEXE.DOC
  2560  Implode   1312  49%  09-03-87 11:12  b89abd8c  --w  TYPOS.DOC
   423  Implode    337  21%  09-03-87 11:14  131dd142  --w  PINTS.DOC
  2793  Implode   1264  55%  09-03-87 19:16  dab0a3b5  --w  DCA.DOC
  6638  Implode   3082  54%  01-25-89 21:52  80046b74  --w  ADME.DOC
 14848  Implode   5514  63%  03-02-89 09:03  7f2d751b  --w  IIM1.DOC
 10240  Implode   4312  58%  03-02-89 09:04  70324a2f  --w  IIM2.DOC
 75264  Implode  23261  70%  03-02-89 09:16  8f5baa0f  --w  IIM3.DOC
------          ------  ---                                -------
126078           43615  57%                                     12
```

2-2 The –vd option will display the View information sorted by date.

in FIG. 2-2.

D:> PKZIP ALLFILES.ZIP -vd

In the example shown below, the additional technical information will be displayed. The files are sorted alphabetically by name. The output displayed in FIG. 2-3 would be repeated for each file within the ZIP file.

C:\WORD> PKZIP -vtn DOCS.ZIP

```
          Filename: M3.DOC
         File type: text
        Attributes: --w
     Date and Time: Jul 17,1989  09:15:00
Compression Method: Implode
   Compressed Size:    8258
 Uncompressed Size:   25600
  32 bit CRC value: 27418eb3
        Created by:   PKZIP: 1.0 under MS-DOS
 Needed to extract: PKUNZIP: 1.0
```

2-3 Display of additional technical data with the –vt option.

Any of the View options listed above can be set in a configuration file. This file is a text file, usually in the current directory, that can be used to set parameters to values other than the default values. For example, if you wanted to always display the files contained in a ZIP file sorted by extension, this option can be set in the configuration file. If no View options are specified, the default View setting is the order in which the files were compressed in the ZIP file. Any view options specified on the command line will, however, override the configuration parameters.

The following View options can be set in the Configuration file. The corresponding command line option also is listed for reference.

```
VIEW = date        -vd
VIEW = extension   -ve
VIEW = name        -vn
VIEW = ratio       -vp
VIEW = size        -vs
VIEW = natural     -vo
VIEW = reverse     -vr
VIEW = brief       -vb
VIEW = long        -vt
VIEW = comments    -vc
```

As in the view options specified on the command line, the last four options (reverse, brief, long, and comments) can be combined with any of the sorting options listed above. For more detailed information, see the section on the configuration file.

`-c -C` Create file comments. This option is case sensitive. It is used to create file comments for the individual files contained in the ZIP file. The maximum length for the comments is 60 characters. You will be prompted to enter the comments. If a comment already exists, you can edit it or press the Enter key to retain the same comment. To delete an existing comment, press the Space bar, followed by the Enter key.

The `-c` (lowercase) option is used to edit all comments for existing files or files that are added. The `-C` (uppercase) option is used when you want to create comments for only the new files that were added to the ZIP file. It is used along with the add/update options. If `-C` is used without any other options, it has the same effect as `-c`.

```
C:\PK> PKZIP TEXTFILE.ZIP -C -u
```

In the above example, any comments on existing files will be retained and you will be prompted to enter comments only for the newly added files.

`-z` Create a Zipcomment. This option allows you to create a descriptive label for your ZIP files. The Zipcomment then will be displayed automatically by PKZIP or PKUNZIP whenever the specific ZIP file is processed.

When you type in the command, as shown below, you will be prompted to enter the Zipcomment. The `-z` option can also be used to edit an existing Zipcomment.

The `-z` option can be used alone on an existing zip file or in combination with any of the add/update commands. Examples are shown below.

```
C:\PK> PKZIP ZIPDOC -z
```

After entering the above command, the program will prompt you to type in a Zipcomment for the ZIP file 'ZIPDOC.ZIP.' After entering the Zipcomment, press the Enter key to save it.

```
C:\PKWARE> PKZIP ZIPDOC -z -a *.DOC
```

In this example both files and Zipcomments will be added. To add files and add a Zipcomment, both the -z and one of the add/update commands must be entered.

-x Exclude files from the ZIP file operation. This option is used to exclude files from the current operation. It can be used along with any of the MS-DOS file handling descriptions. It also can be used along with most of the ZIP command options such as add, update, view, delete, etc.

```
C:> PKZIP STUFF *.* -x*.BAK
```

In the above example, all of the files in the current directory will be compressed into the file STUFF.ZIP except the files with a .BAK extension.

-b[*path*] Create temporary ZIP file on an alternate drive or path. This option is designed to be used when insufficient disk space is a problem. Every time a ZIP file is updated, PKZIP creates a new pre-ZIP file. When the updating is completed, the original ZIP file is deleted automatically and the pre-ZIP file becomes the new ZIP file. The result of this operation is that you need disk storage space equal to at least twice the actual size of the ZIP file while updating the ZIP file.

Disk space is generally not a problem on a hard disk but can pose restrictions on a floppy disk. If adequate disk space is not available, the program will stop.

The -b option will locate the pre-ZIP file on the path and location specified. This file is used only in the process of updating the original ZIP file. It will replace the original ZIP file and will not exist on the location specified in the -b option, when the update process is completed. The -b option can be used along with any of the update options.

```
C:> PKZIP A:ZIPDOC *.DOC -bc: -u
```

The above example illustrates the use of the -b option. A ZIP file, ZIPDOC, located on drive A will be updated with all the .DOC files.

A temporary ZIP file, used in the update process will be located on the C drive. This file will not exist when the update process is completed.

-e[x,s,a,b] Use extra compression options. This option is used to specify the compression algorithm to be used in creating the ZIP file. There are two types of compression that can be used: Shrinking and Imploding. The options are explained below.

-ex This option specifies the Imploding method is to be used on all files being compressed. In general, it provides a greater degree of compression over the Shrinking method. Note that -ex does not try both Shrinking and Imploding. In most cases where Shrinking would work better than Reducing in PKZIP 0.9x, Imploding will do better than Shrinking. Imploding is the default for PKZIP.

`-es` This option specifies the Shrinking method is to be used on all files being compressed. In general, it provides a faster method of compression over the Imploding method.

`-ea` This option specifies the Imploding method is to be used on all ASCII files and the Shrinking method is to be used on all binary files.

`-eb` This option specifies the Imploding method is to be used on all binary files and the Shrinking method is to be used on all ASCII files.

Note: You should be aware of the following when specifying a compression method.

- ☐ Using `-ea -eb` is the same as using `-ex`.
- ☐ Numbers after the parameters such as `-ex4` or `-ea3` are accepted for compatibility with PKZIP 0.92 but they have no effect on the data compression in PKZIP.
- ☐ Regardless of the compression method specified, files smaller than 320 bytes in size will be Shrunk, if enough memory is present.
- ☐ Shrinking requires more memory than Imploding. If there is enough memory to perform Imploding but not enough memory to perform Shrinking and any of the last three options listed are chosen, PKZIP will issue a warning and use Imploding instead. Shrinking requires about 128K to run, and Imploding approximately 90K.

Some example commands are shown below.

```
C:> PKZIP ZIPDOC -es *.DOC
```

This command would Shrink all the files with a .DOC extension into the ZIP file.

```
C:> PKZIP -ea ZIPDOC
```

This command would Implode the ASCII files and Shrink the binary files.

`-p -P` Store relative paths with filenames in the ZIP file. This option is case sensitive. It allows you to store the directory and path information pertaining to each file within the ZIP file (or list file).

If `-p` (lowercase) is used, all the pathnames that are recursed into will be stored in the ZIP file. The `-p` option is meaningful only when used with the `-r` option explained below. If `-P` (uppercase) is used, all the pathnames specified on the command line and those recursed into will be stored in the ZIP file.

`-r` Recurse through subdirectories. This command allows you more flexibility when creating or updating ZIP files. The program will recurse

through specified directories when obtaining files to compress. For example:

```
C:> PKZIP ALLDOC -r D:*.DOC C:\WORD\PK\*.TXT
```

This command will search all .DOC files on the D drive and all .TXT files on the C:\WORD\PK directory and all directories below. For example:

```
C:\DATA> PKZIP -rp STUFF
```

This example will compress all the files in the current directory, and all directories below the current subdirectory. PKUNZIP can then restore this directory tree either in the same directory or at any place in the directory tree. An entire directory tree can be compressed into a ZIP file and then restored by using the -d option in PKUNZIP. (See the -d option for PKUNZIP.)

By default, only the filename will be stored, unless the -p or -P option is specified on the command line.

-l Display the license screen. This command will display the software license agreement.

```
C:> PKZIP -l
```

-h Display the help screen. This command will display a help screen whenever typed on the command line.

```
D:\PKWARE> PKZIP -h
```

-spassword Scramble files with password. This option is used to scramble, or encrypt, the files in the ZIP file. It includes password protection. When extracting the ZIP file, the files will not be extracted unless the correct password is included on the command line.

When specifying the password, there is no space between the "s" and the password. Also, the password is case sensitive. It must be entered exactly the same when you unzip the file. It is important that you remember or record the passwords that you use, because PKZIP does not retain a record of these passwords anywhere.

```
C:\FINANCE> PKZIP PAYROLL -m -sSecret *.PYR
```

In the above example, the ZIP file PAYROLL will be created with all the files having a *.PYR extension. In order to unzip this file, the password 'Secret' will have to be specified exactly as shown above.

-q Enable ANSI Comments. This option can be used to override a command in the configuration file. By default, ANSI sequences are disabled. ANSI sequences are enabled or disabled in the configuration file by the following commands.

```
ANSI = Enabled
ANSI = Disabled
```

To override the configuration string, simply include the -q or -q- option on the command line. An example is shown below:

```
C:\MAIN> PKZIP ALLFILE.ZIP -u -q-
```

In this example, the ZIP file, ALLFILE.ZIP, will be updated. If the ANSI comments had been enabled in the configuration file, they would be disabled by the -q- option on the command line.

-o Set ZIP file date to latest file date included. This option can be used to override a command in the configuration file. By default the ZIP file being created will be given the current time and date. By using the following command in the configuration file, the ZIP file date will be determined by the date of the latest file included in the ZIP file.

```
ZIPDATE = latest
```

To override the configuration string, simply include the -o or -o- option on the command line. *Note:* This option is denoted by the letter o, not a zero. An example is shown below.

```
C:\MAIN> PKZIP DONE.ZIP -a -o- *.DOC
```

In this example, all the files with a .DOC extension will be added to the ZIP file. The file then will be given the current date. Assuming the ZIPDATE had been set to "latest" in the configuration file, it would be overwritten to current by the -o- option on the command line. See the -k option for related information.

-k Keep current date on the ZIP file. This option can be used to override a command in the configuration file. By default, the ZIP file being created will be given the current time and date. By using the following command in the configuration file, the current ZIP file date will be retained when the file is updated.

```
ZIPDATE = keep
```

To override the configuration string, simply include the -k or -k- option on the command line. An example is shown below.

```
C:\MAIN> PKZIP DONE.ZIP -f -k- *.TXT
```

In this example, all the files with a .TXT extension will be freshened in the ZIP file. The file then will be given the current date. Assuming the ZIPDATE had been set to keep in the configuration file, it would be overwritten to current by the -k- option on the command line. See the -o option for related information.

-w[h,s] Include hidden or system files. This option is used to specify whether or not the hidden or system files will be included in the ZIP file. It can be used to override a command in the configuration file. By default,

hidden or system files will not be included. By using one of the following commands in the configuration file, you can specify whether system or hidden files will be included by default.

```
INCLUDE = hidden
INCLUDE = system
```

To override the string in the configuration file, simply include the `-w[h,s]` or `-W[h,s]` option on the command line. To specify hidden files, use H. To specify system files, use S. An example is shown below.

```
C:\DOS> PKZIP ALL.ZIP -a -Whs
```

In this example, all of the files in the current directory will be compressed into ALL.ZIP except the hidden and system files. Assuming the hidden files had been included in the Configuration file, this command overrides the Configuration file. Note that there is no space between the W (or w), and the h or s.

For more detailed information, see the section on the configuration file.

`-j<h,s,r>` Mask hidden, system, or read-only file attributes. This option is used to mask the hidden, system, or read-only attributes of files, so they can be treated as normal writable files. This command can be used to override commands in the configuration file. By default, these files will not be masked.

By using the following commands in the configuration file, you can specify whether system, hidden, or read-only files will be masked, and thus treated as normal writable files.

```
MASK = hidden
MASK = system
MASK = read-only
```

To override the string in the configuration file, simply include the `-j<h,s,r>` or `-J<h,s,r>` option on the command line. To specify hidden files, use H. To specify system files, use S. To specify read-only files, use R. An example is shown below.

```
C:\DOS> PKZIP SAVE.ZIP -a -jrh -whs IBMBIO.COM
IBMDOS.COM
```

In this example, the hidden/system/read-only files IBMBIO.COM and IBMDOS.COM will be included in SAVE.ZIP. However, their hidden and read-only attributes will be masked off in the .ZIP file, saving them with the system attribute only.

When the hidden, system, and read-only attributes of files are masked off, the `-v` (View) option will display the attribute as `--w` (for writable) in the attribute column. Note that there is no space between the J (or j) and the h, s, or r.

Using PKUNZIP

Use the PKUNZIP program to extract compressed files from a ZIP file. An entire ZIP file can be extracted, or specific files can be delegated to be extracted. PKUNZIP is used as a command at the DOS prompt. The syntax for the command is shown below.

```
PKUNZIP [options]zipfile [d:path\] [file...]
```

where the command line parameters are

zipfile	ZIP filename. The default extension is .ZIP.
file	Names of files to compress. Wildcards * and ? are ok. The default is all files.
-c[m]	Extracts files to the console [with more].
-d	Uses the pathnames stored in the ZIP file and creates the paths on extraction if they do not already exist.
-h	Displays a help screen.
-j[h,r,s]	Specifies masking or unmasking of file attributes.
-J[h,r,s]	
-l	Displays the license agreement.
-n	Extracts files from the ZIP file only if they are newer than the ones already on the disk.
-o	Overwrites existing files without asking for confirmation.
-p[a/b] [c] [n]	Extracts files to a printer.
-s*password*	Unscrambles the files with password protection.
-t	Tests the ZIP file for corruption.
-q	Enables ANSI comments.
-v[b,r,c,	Views technical information about files in the ZIP.
d,e,n,p,s]	
-x	Extracts files from the ZIP file.

PKUNZIP examples

Here are some examples to show how PKUNZIP is used as a command. The command line options are explained in greater detail in the next section.

```
C:> PKUNZIP ANYFILE.ZIP A:
```

This command will extract all the files in the ZIP file ANYFILE.ZIP. It will locate extracted files on the A drive.

```
C:> PKUNZIP A:ANYFILE.ZIP *.C
```

In this example the ZIP file located in the A drive will be extracted on the C drive. The destination is the C drive by default. Only the *.C files will be extracted.

```
C:> PKUNZIP \COLLECT\ANYFILE.ZIP A: -o
```

In this example, the path location of the ZIP file is specified. The files will be extracted on the A drive. With the -o option, the file with the same name as those existing on the A drive will overwrite the already existing files, without asking for user confirmation.

PKUNZIP command options

The command options used in extracting a ZIP file will be explained in detail in this section. You will find that the new command format is much more flexible and easier to use. Listed below is a summary of important facts to keep in mind while using PKUNZIP.

- The command options generally can be placed anywhere on the command line.
- The first filename listed on the command line will be interpreted as the ZIP file to be extracted. Subsequent filenames will be interpreted as specific files to be extracted.
- The command can be typed using either uppercase, lowercase, or any combination.
- All command options must be preceded by a - (hyphen) character (i.e., -v) or the MS-DOS switch character, usually / (slash).
- Unlike PKZIP, unrelated options of PKUNZIP cannot be combined.

The default values for the command line are as follows:

- If no options are entered, the default is -x, the extract files option.
- If no extension is specified for the ZIP file, the .ZIP extension is assumed.
- If no destination is specified for the extracted files, they will be located in directory that the program is being run from.
- If no file specs (filenames, with or without wildcards) are listed, the default is *.*.

PKUNZIP details

This section will give a detailed explanation of the command options used in the PKUNZIP command. The command options are explained in groups determined by function. The options pertaining to extracting ZIP files are explained first, followed by the view options, print options, and miscellaneous options.

-x Extract files from a ZIP file. This command will extract files from a ZIP file. Either the entire ZIP file can be extracted or certain files can be specified to be extracted. The extracted files will be located in the current directory unless you specify a destination. The -x option is the default option for the PKUNZIP command.

If a file being extracted already exists at the same destination where the extracted files are being located, the program will prompt you for confirmation before it overwrites the existing file.

```
C:\DB> PKUNZIP -x A: LISTS.ZIP *.DBF *.TXT
```

In the above example, all of the files with a .DBF or a .TXT extension will be extracted from the ZIP file called LISTS. The ZIP file is located on the A drive. When the noted files are extracted, they will be located in the C:\DB directory.

-o Extract files from the ZIP file and overwrite existing files on disk. This command will extract files from a ZIP file and automatically overwrite any duplicate filenames found in the destination where the extracted files are being located. The program will not prompt you for confirmation before overwriting these files.

The entire ZIP file can be extracted, or certain files can be specified to be extracted. The extracted files will be located in the current directory unless you specify a destination.

```
C:> PKUNZIP ZFILE *.DOC -o
```

In the above example, all of the files with a .DOC extension will be extracted from the ZIP file called ZFILE (the .ZIP extension is assumed). As the files are being extracted, any files with the same name in the current directory will be automatically overwritten.

-c[m] Extract files from a ZIP file and display them on the screen. This command will extract files from a ZIP file and display them on the monitor. The extracted files will scroll continuously on the screen. The software can be told to pause after each screen of output by using the -cm (more) option.

```
A:> PKUNZIP STUFF -c DATES.DOC
```

In this example, the file DATES.DOC will be extracted from the noted ZIP file and displayed on the screen.

-n Extract only new files from the ZIP file. This command will extract files from the ZIP file only if they are newer than the duplicate filenames already on the disk, or if they do not already exist on the disk. This option serves as an overwriting safeguard. It will not allow an older version of a file in a ZIP file to overwrite a newer version on disk. "Newer" is defined as the most recent time and date created.

```
C:> PKUNZIP -n C:\DB\LISTS *.DBF
```

In this example, all of the files with a .DBF extension that are dated more recently than any duplicate filenames on disk or that do not already exist on disk will be extracted from the ZIP file LISTS.

`-t` Test the ZIP file. This option is used to test the files to make sure they are valid and have not been corrupted. The files will be listed as they are being tested; "OK" will be printed after each file if it is not corrupted. This option does not extract files from the ZIP file; it only tests them. For instructions on reconstructing a ZIP file that has been corrupted, see the section on PKZIPFIX.

```
C:\WORD\PK> PKUNZIP ZIPDOC *.DOC -t
```

In the above example all the .DOC files will be tested from the ZIP file ZIPDOC.

`-v[b,t] [c,d,e,n,p,s]` View technical information. This option will display technical information concerning the files contained within a ZIP file. There are several options available with the View option. The view options for PKUNZIP are the same as those for PKZIP, except for `-vc`. In PKUNZIP, `-vc` will cause the files to be sorted by the 32-bit CRC value. Also, there is no `-vt` (view more technical information) option.

The following information about each file in the ZIP file will be displayed on the screen.

Length	Original length of the file
Method	Type of file compression used, Implode or Shrink (or Reduce if an older version of PKZIP was used)
Size	Size of the compressed file
Ratio	Percent reduction in file size
Date	Actual date of the file
Time	Actual time of the file
CRC-32	The CRC-32 value of the file
Attribute	The attribute of the file (s=System, h=Hidden, w=Writable, r=read-only file, and *=encrypted file
Name	Name of the file

The View options for PKUNZIP are explained below. The options determine how the information will be displayed and sorted. The following display options are available:

`-vb` The -b (Brief display) option will display all the information shown above, except the CRC-32 value and the file attribute.

`-vr` Display information in reverse order from the default order. This option is used with any of the sorting options listed below to reverse the order of sorting.

The following sorting options are available with the View option. The default order of sorting also is specified. (This order can be reversed by using a particular sorting option with the `-vr` (View Reverse) option.)

-vo Sort by date of files, oldest to most recent.
-ve Sort by file extension, alphabetically.
-vn Sort by name of files, alphabetically.
-vp Sort by percentage ratio of compression, smallest to largest.
-vs Sort by size of files, smallest to largest.
-vc Sort by 32-bit CRC value.

If no sorting option is specified, the files will be displayed in the order they were compressed.

The following command illustrates the View option used to display a ZIP file sorted by name. The output display is shown in FIG. 2-4.

```
D:> PKUNZIP BACKUPS.ZIP -vn
```

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
10752	Implode	3933	64%	07-06-89	19:23	426c896a	--w	AGO.BAK
25600	Implode	8525	67%	07-13-89	17:55	bacc8813	--w	DM1.BAK
41984	Implode	13320	69%	07-10-89	21:36	b20889a9	--w	DM2.BAK
26112	Implode	8470	68%	07-11-89	18:53	eb623405	--w	DM3.BAK
16896	Implode	6153	64%	07-10-89	20:52	05d3ba41	--w	DM4.BAK
28601	Implode	8602	70%	07-13-89	18:49	c0bd9829	--w	EM4.BAK
7168	Implode	2456	66%	01-04-80	14:57	007c1270	--w	EXE.BAK
4608	Implode	1906	59%	06-28-89	23:35	d70bcf7e	--w	FMAL.BAK
6656	Implode	1926	72%	06-28-89	13:00	7447224b	--w	PK.BAK
3072	Implode	1181	62%	06-28-89	16:59	597bade0	--w	PK1.BAK
6144	Implode	2350	62%	01-04-80	13:48	96bb2322	--w	SAVE.BAK
1240	Implode	754	40%	07-10-89	11:23	8899969f	--w	TEEN.BAK
8704	Implode	3504	60%	06-29-89	19:26	760cc345	--w	TIAL.BAK
26624	Implode	8495	69%	06-29-89	00:16	8849114b	--w	TZIP.BAK
38400	Implode	12080	69%	06-29-89	18:31	53619fb8	--w	UZIP.BAK
927	Implode	502	46%	07-17-89	18:31	61b90c8f	--w	WIEW.BAK
319	Shrunk	246	23%	07-17-89	18:33	045dda73	--w	XXXZ.BAK
253807		84403	67%					17

2-4 The -vn option will display the View information sorted by name.

-p[a/b] [c] [n] Extract files to a printer. This option is used to extract files from a ZIP file and send them to a printer for printing. The command parameters are defined below. The parameters of the print option must be programmed together on the command line (i.e., -pac1 is correct -p -a -c1 is not correct).

-p Specifies the extract to printer option.

a/b The a and b parameters will set the printer device to either ASCII or binary mode respectively. If no mode is specified, the default mode for the device will be used. ASCII mode commonly is used

to print text. It will form feed after each file. Binary mode corresponds to the COPY command commonly used to send fonts or graphics to a laser printer. It will not form feed after each file. The a and b options cannot be mixed in the same command.

-c This option specifies the port that the data should be sent through. If c is included in the print option, it specifies that a serial (COM) port is to be used. If c is not included in the print option, a parallel (LPT) port is to be used.

n The number of the print port being used. It can be any number from 1 to 4. If no number is listed, 1 is assumed by default.

For example

```
C:> PKUNZIP -pbc2 PICTURE.ZIP
```

In the above example, the files compressed in the ZIP file PICTURE will be extracted and printed in binary mode to the serial port COM2.

```
C:> PKUNZIP STUFF *.DOC -p
```

In the above example, all the .DOC files will be extracted from STUFF.ZIP to the parallel port LPT1.

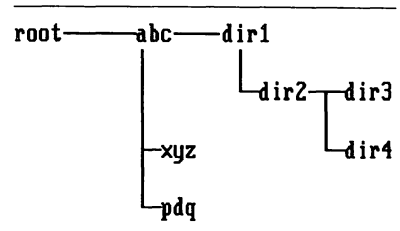
-d Recreate directory paths upon extraction. This command option uses the pathnames that have been stored in the ZIP file. The directory pathnames are stored in the ZIP file by using the -p, -P, and -r options in the list of PKZIP commands explained earlier. If the stored output paths do not exist at the extraction destination, this command will create them as they are stored in the ZIP file.

For example, if the directory tree shown in FIG. 2-5 exists on drive C and you executed

```
PKZIP -r -p A:STUFF C:\ABC\*.*
```

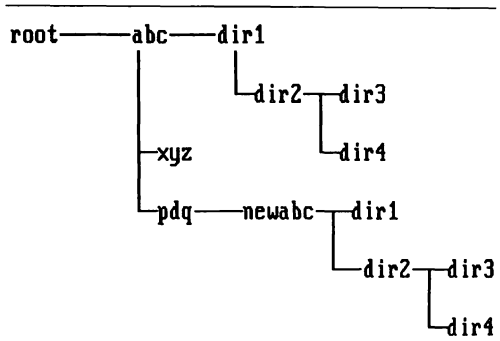
and then executed

```
PKUNZIP -d A:STUFF C:\PDQ\NEWABC
```



2-5 Example of a directory tree.

Then, after the PKUNZIP command is processed, the C drive would look like FIG. 2-6.



2-6 Using PKUNZIP with the -d option will create new subdirectories.

All of the files originally in C:\ABC and its subdirectories (dir1, dir2, dir3, and dir4) have been restored to C:\PDQ\NEWABC, with the directory tree being recreated.

If the -d option is not specified and pathnames have been stored in the ZIP file, only the filenames stored in the ZIP file will be used, any pathnames will be ignored.

-h Display help screen. This command will display a help screen whenever typed on the command line. The help screen also will occur when a command has been entered incorrectly.

```
D:\PKWARE> PKZIP -h
```

-l Display the License screen. This command will display the software license agreement.

-q Enable ANSI Comments. By default, ANSI sequences are filtered from the comments. This option allows any ANSI sequences to be displayed unfiltered.

```
C:\ACCT> PKUNZIP ACCT.ZIP -o -q
```

In this example, the ZIP file will be uncompressed (overwriting files existing on disk) and the ANSI comments of the file being extracted will be enabled.

j [h,s,r] Mask hidden, system, or read-only file attributes. This option is used to mask the hidden, system, or read-only attributes of files, so they will be treated as normal writable files. By default, hidden, system, and read-only attributes are masked off upon extraction. To preserve these attributes, the -J (uppercase) option must be used.

```
C:\DOS> PKUNZIP ALL.ZIP -Jhs
```

In this example, any hidden or system file attributes of the files being extracted will be preserved. Note that there is no space between the J (or j) and the h, s, or r.

-spassword Unscramble files with password. This option is used to unscramble, or decrypt, the files in the ZIP file. It is used in combination with the -s (Scramble) option of the ZIP options and includes password protection.

When unzipping a ZIP file that has been encrypted, the files will not be extracted unless the correct password is included on the command line. Unzip skips encrypted files if the password is not stated on the command line. When specifying the password, there is no space between the s and the password. The password also is case sensitive. It must be entered exactly the same as when you zipped the file. It is important that you remember or record the passwords that you use, because PKZIP does not retain a record of these passwords anywhere.

```
C:\FINANCE> PKUNZIP PAYROLL -o -sSecret *.PYR
```

In the above example, all of the files with a *.PYR extension will be extracted from the ZIP file PAYROLL. In this case, the password specified when the file was zipped was "Secret."

Creating self-extracting ZIP files

ZIP files can be extracted without PKUNZIP through the use of self-extraction methods. This procedure is useful when you need to transfer compressed files to a person who might not be familiar with file compression and extraction procedures or who does not have the PKUNZIP program. The self-extracting ZIP file is an executable file with an .EXE extension. By simply typing in the name of the self-extracting ZIP file, the PKUNZIP extraction process will be performed.

All self-extracting ZIP files can be treated as normal ZIP files. All of the PKZIP and PKUNZIP options can be performed on a self-extracting ZIP file. The only difference is that the .EXE extension must be specified on the command line or the program will search for a ZIP file with the same name.

In the example shown below, files in the self-extracting ZIP file, STARTUP.EXE, will be freshened using the PKZIP -f option.

```
C:\PKWARE> PKZIP STARTUP.EXE -f
```

There also are several options that are available to use while extracting the self-extracting ZIP file. These are listed in the PKSFX reference guide in the next section. An example is shown below.

```
C:\PKWARE> SEZIP -d C:\
```

In this example, the self-extracting ZIP file will be extracted with the -d options. The directories stored in the ZIP file will be reconstructed on the C drive.

The ZIP2EXE program is used to create a self-extracting ZIP file from a ZIP file, while leaving the original ZIP file intact. ZIP2EXE uses PKSFX .PRG to create the self-extracting ZIP file. PKSFX must be in the current directory or PATH when creating the self-extracting file. The program MAKESFX will create PKSFX.PRG from the distribution file. (You must run MAKESFX initially before you can create any self-extracting files.)

The following steps illustrate the process of creating a self-extracting ZIP file. If you have not run MAKESFX to create PKSFX.PRG, you must do these steps first.

1. Create the ZIP file using PKZIP.
2. Create the self-extracting file by entering:

   C:\> `ZIP2EXE` *`zipfile`*

   Where *zipfile* is the name of the ZIP file you want to create the self-extracting file from. The default extension is .ZIP, if none is given.

When the process is completed a message, such as the one shown below, will be displayed on the screen to let you know the conversion has been successful.

```
zipfile.ZIP => zipfile.EXE
```

How a ZIP file is made

PKZIP creates a temporary preZIP file that has an extension of .!!!, such as in OLDFILE.!!!, during the compressing process. OLDFILE.!!! is the upgraded version of OLDFILE.ZIP.

When all of your files have been successfully compressed, the original ZIP file is deleted and the file with the extension .!!! is simply renamed with a new extension, .ZIP.

It is faster to rename the temporary ZIP file than to copy it from one disk drive to another. The fastest way to create your ZIP files is from your largest disk drive. The `-b` option is used to locate the preZIP file on an alternate drive location, when your disk space is limited.

Use of a RAM disk with PKZIP

PKZIP swaps information to and from disk memory as the program runs. This process is not the same as the physical creation of the new ZIP file. The default drive for this program activity is the drive from which the program was executed. You can speed up performance, as well as gain disk space, by telling PKZIP which drive and/or subdirectory to use through a DOS environmental string. All routing can be directed to your RAM disk by using the SET PKTMP command.

```
C:> SET PKTMP=D:
```

where D refers to the RAM disk.

Local area network support

Both PKZIP and PKUNZIP, when opening files for read-only type access, automatically will open files in SHARE "deny write access" mode. This feature pertains to systems running with DOS 3.0 or above, so files can be read concurrently by other tasks. PKZIP uses a unique filename for all temporary files created. PKZIP then can be run by concurrent programs or on a network drive without any file contention or conflict.

Creating a preselected list file

List files are created to record file selections you use frequently. These list files then can be typed on the command line instead of typing all the filenames separately. List files can be used with all the PKZIP and PKUNZIP command options.

The procedure for creating list files is somewhat easier with the new PKWARE programs. The following illustrates the steps necessary for creating list files.

1. Create the list using a word processor or text editor.
2. Type in the names of the files you select using any MS-DOS file notation.
3. Include the directory and path locations of the files in the list.
4. Save the list file under the name you chose. There is no default extension.

When using a list file, the filename is preceded by the @ symbol on the command line. If the list file is not in the directory, the @ symbol is put before the PATH designation. *Note:* more than one list can be used on one command line.

The list file can be mixed with other options. Examples are shown below.

```
C:> PKUNZIP -r NEWFILE.ZIP @GROUP
C:> PKUNZIP ANYFILE.ZIP TODAY.TXT @GROUP @DATA
C:> PKZIP -u MOREFILE @GROUP @\LOTUS\ACCOUNTS
C:> PKZIP -a OLDFILE *.DBF @OLDSTUFF
```

Using PKZIP and PKUNZIP in batch files

When running PKZIP and PKUNZIP with other applications, you can determine whether the PKWARE experienced an error by using the DOS error-level variable. PKZIP and PKUNZIP will return a zero error level if no errors occur.

If an error occurs, the software will return one of the following error codes:

PKZIP:	0	No error.
	1	Bad filename or file specification.
	2,3	Error in ZIP file.
	4-11	Insufficient memory.
	12	No files were found to add to the ZIP file, or no files were specified for deletion.
	13	File not found. The specified ZIP file or list file was not found.
	14	Disk full.
	15	ZIP file is read-only and cannot be modified.
	16	Bad or illegal parameters specified.
	17	Too many files.
PKUNZIP:	0	No error.
	1	Warning error (such as failed CRC check).
	2,3	Error in ZIP file.
	4-8	Insufficient memory.
	9	File not found. No ZIP files found.
	10	Bad or illegal parameters specified.
	11	No files found to extract/view etc.
	50	Disk full.
	51	Unexpected EOF in ZIP file.

If testing error levels in a batch file, DOS does not test the error level for equality, but for greater-than-or-equal-to. For example, if the software exits with an exit code of 10, error level 10 will be true, so will error level 9, error level 8, and so on. Error level 0 will always test as true; therefore, error levels should be tested in descending order.

The following example shows how PKUNZIP can be used in a batch file.

```
PKUNZIP STUFF -d D:\TEMP
if errorlevel 51 goto err51
if errorlevel 50 goto err50
if errorlevel 10 goto err10
if errorlevel 9 goto err9
if errorlevel 4 goto err4
if errorlevel 2 goto err2
if errorlevel 1 goto err1
echo No Error
goto exit
:err51
echo Unexpected EOF
goto exit
```

```
:err50
echo Disk Full
goto exit
.
.
```

The configuration file

The configuration file can be used to set parameters to values other than the normal default values. These values then will be the defaults for the specified parameters. You can override any parameters that are set in the configuration file by entering contrary instructions on the command line.

PKZIP will look in the current directory for the configuration file called PKZIP.CFG. If the file is not found, PKZIP will look for an environment variable of the form `PKZIP.CFG=d:\path` and will look in the specified path for PKZIP.CFG.

TABLE 2-1 provides a brief explanation of the configuration options for PKZIP and their equivalent command line options. An asterisk (*) indicates that the option is the default for PKZIP.

For some of the parameters, only one value can be specified. For example, ANSI can be either enabled or disabled. In other cases, more than one variable can be set per parameter. For example, INCLUDE can be set to system and/or hidden files.

The parameters can be typed in uppercase, lowercase, or a combination of both. When more than one variable can be set per parameter, the variables can be listed on the same line, separated by a comma (,), a slash (/), or a space.

For example, when setting the `MASK` parameter to include all read-only, hidden, and system files to be masked any of the following programming methods would be acceptable.

```
MASK=read-only
MASK=hidden
MASK=system
MASK=read-only,hidden,system
MASK=read-only hidden system
MASK=read-only/hidden/system
MASK=read-only,hidden/system
```

There are two environmental variables that can be set. These environmental strings can be typed in on the command line at the DOS prompt. The following example sets the path for the configuration file.

```
C:> SET PKZIP.CFG = C:\UTILS
```

Table 2-1 Configuration File Commands

Configuration command	Command line option	default
ANSI = enabled	-q	
= disabled	-q-	*
ZIPDATE = latest	-o	
= keep	-k	
= current	-k- -o-	*
INCLUDE = hidden	-wh	
= system	-ws	
EXCLUDE = hidden	-WH	*
= system	-WS	*
Note: These options can be combined. For example: INCLUDE = hidden/system		
MASK = read-only	-jr	
= hidden	-jh	
= system	-js	
PASS = read-only	-Jr	*
= hidden	-Jh	*
= system	-Js	*
Note: These options can be combined. For example: MASK = hidden, system		
VIEW = comments	-vc	
= extension	-ve	
= size	-vs	
= date	-vd	
= name	-vn	
= ratio	-vp	
= natural	-vo	*
= reverse	-vr	
= brief	-vb	
= long	-vl	
Note: Some of these options can be combined. The last three options, reverse, brief and long, can be combined with any of the above options.		
COMPRESS = size	-ex	*
= speed	-es	
PATHS = none	-p-	*
= all	-p	
= recurse	-p	
RECURSE = on	-r	
= off	-r-	*

In this case, PKZIP.CFG is located in the UTILS directory. Use the location of your choice. The next example sets a RAM disk.

```
C:> SET PKTMP=D:
```

This command will speed up the program operation default by directing the mechanics of PKZIP to a RAM disk. This procedure has nothing to do with the creation of the "new" archive file during the add or upgrade process.

Error messages

The following error messages can appear when using PKZIP. When the word "Warning" appears in the message, program execution will continue, otherwise, the program will abort to DOS. A brief explanation of each message follows.

PKZIP: Can't open XXXX.ZIP for write access! The named ZIP file is read-only or is locked by another application and cannot be modified.

PKZIP: No file(s) found. No matching files were found to list using the View option.

PKZIP: Insufficient disk space for updated files: XXXX-.ZIP. The -b option was used, and there is not enough space on the original drive containing the ZIP file to receive the updated ZIP file. Try to free up some disk space on the drive containing the ZIP file and retry the operation. Also, make sure that the drive specified with the -b option is different than the drive containing the ZIP file.

PKZIP: Insufficient disk space for ZIP comment. There is insufficient disk space to hold the comment as entered.

PKZIP: Warning! Not enough memory for Shrinking method. The -es, -ea, or -eb options were used to specify that certain files should be Shrunk. However, there is not enough memory available to perform Shrinking. Instead, all files will be Imploded.

PKZIP: Warning! Can't delete XXXXX. The -m (Move) option was specified to delete files after the ZIP file was constructed. However, the named file could not be deleted and is probably read-only.

PKZIP: No files specified for deletion! The -d (Delete) option was specified, but no filenames were given to delete. This option does not default to *.* if no filenames are given.

PKZIP: Nothing to do! No matching files, or files with the specified attributes, or files after the specified date, etc., were found to compress.

PKZIP: Insufficient memory. Insufficient memory is available to process the ZIP file. Try making more memory available to PKZIP. If this does not rectify the problem, then the ZIP file might be corrupted and PKZIPFIX should be used to fix the ZIP file.

PKZIP: XXXX.ZIP-error in ZIP, use PKZIPFIX. The named ZIP file has a corrupted file index. Use PKZIPFIX to reconstruct the ZIP file.

PKZIP: Can't create: XXXX. The named file could not be created. Either the target directory is full, the file already exists and is read-only, or is locked by another application.

PKZIP: Disk full, file: XXXX. A disk full error occurred while writing to the specified file. Try freeing up some disk space on the target drive. Also, see the -b option and the PKTMP environment variable.

PKZIP: Can't find: XXXX.ZIP. The named ZIP file could not be found.

PKZIP: Too many files. There are too many files to compress into one ZIP file. The limit is 3900 files per ZIP file.

The following error messages can appear when using PKUNZIP. A brief explanation of each message follows.

PKUNZIP: Warning! File XYZZY already exists. Overwrite (y/n)? The file XYZZY already exists on the disk. Pressing n will leave the original file on the disk and not extract the file from the ZIP file. Pressing y will extract the file from the ZIP file and overwrite the file on the disk. Also, see the -o and -n options.

PKUNZIP: Warning! I don't know how to handle: XYZZY. The file XYZZY is compressed or encoded in a way that this version of PKUNZIP is unable to handle. Either a later version of PKUNZIP is required to properly extract this file, or the ZIP file is possibly corrupted.

PKUNZIP: Warning! Inconsistent local header for file: XYZZY. The local header for file XYZZY is different than the central header information. Use PKZIPFIX to reconstruct the ZIP file.

PKUNZIP: Warning! File fails CRC check. The CRC-32 check for the file being extracted or tested did not match the stored value for the file. The file is probably corrupted.

PKUNZIP: Warning! XXXX.ZIP has errors. The named ZIP file had one or more errors detected in it.

PKUNZIP: Warning! File has bad table. The file being tested or extracted has an error in its encoding. The file is probably corrupt.

PKUNZIP: Warning! No file(s) found. No files were found to extract, test, or list.

PKUNZIP: Warning! XXX.ZIP-error in ZIP, use PKZIPFIX. The named ZIP file has a corrupted file index. Use PKZIPFIX to reconstruct the ZIP file.

PKUNZIP: Warning! Insufficient memory. Insufficient memory is available to process the ZIP file. Try making more memory available to PKUNZIP. If this does not rectify the problem, then the ZIP file might be corrupted and PKZIPFIX should be used to fix the ZIP file.

PKUNZIP: Warning! Can't create: XXXXX. The named file could not be created. The output directory is either invalid or full.

PKUNZIP: Can't find: XXXX.ZIP. The named ZIP file(s) could not be found.

PKUNZIP: Can't open: XXXX. The specified file list could not be opened.

PKUNZIP: Warning! Can't open XXXX.ZIP. The named file could not be opened. Either a disk error occurred, or the file is locked by another application.

PKUNZIP: Disk full, file: XXXXX. There is not enough free room on the destination drive/directory to fit the file being extracted. The program will abort and exit to DOS.

PKUNZIP: Incorrect password for file. The ZIP file is password protected and cannot be opened unless the correct password is entered. The password entered was not the correct password.

PKUNZIP: Skipping encrypted file. Only the files that are password will be skipped (not extracted) because they are password protected and the correct password was not entered.

Reconstructing damaged files with PKZIPFIX

PKZIPFIX is an easy to use utility that takes advantage of the extra reliability of the ZIP file format to reconstruct truncated or damaged ZIP files. The ZIP file format was designed for high reliability, using 4-byte signatures for all file headers and redundant distributed and centralized directory structures.

PKZIPFIX, however, cannot create good data out of bad data. If a portion of a ZIP file has been corrupted, PKZIPFIX will allow recovery of the unaffected files. Depending on how badly damaged the ZIP file is, one or more files still might extract with errors.

PKZIPFIX should be used when PKZIP or PKUNZIP indicates that a ZIP file is in error or when a ZIP file has become damaged. PKZIPFIX also can be used to extract the ZIP file portion from a PKSFX self-extracting file.

Using PKZIPFIX

To recover a damaged ZIP file, use PKZIPFIX as shown below. At the DOS command line, type

```
PKZIPFIX zipfile
```

where *zipfile* is the name of the ZIP file to be reconstructed. The .ZIP extension will be assumed by default. PKZIPFIX will attempt to recover *zipfile* and will create a file called PKFIXED.ZIP, which contains the reconstructed ZIP file.

The file that is created by PKZIPFIX, PKFIXED.ZIP, then can be extracted or listed with PKUNZIP. It is strongly recommended that you then use PKZIP to create a new ZIP file from the files that are extracted from PKFIXED.ZIP.

Registration

The stated terms for registration are somewhat loose. According to PKWARE, if you find PKPZIP, PKUNZIP, and PKSFX to be fast, easy, and convenient to use, a partial registration of $25 "would be appreciated." If you sent $47 or more, you will receive, when available, a diskette and manual for the next version of the software.

State the current version number of the software you are presently using and send your check or money order to:

PKWARE, Inc.
7545 North Port Washington Road
Suite 205
Glendale, WI 53217-3422

3
Graphics

In this chapter, two useful programs that are related to computer graphics will be discussed. GEMCAP is a terminate and stay resident (TSR) program that can capture the image on your PC's screen and save it to a disk file. The file is in a standard graphics file format, the GEM .IMG format. Once the image is stored in a file, it can be incorporated into a desktop publishing document or used with other graphics programs that can read the GEM .IMG format.

HGCIBM can be extremely useful to you if you happen to have a Hercules Graphics Card. Many programs don't support the Hercules standard, but almost every program supports the CGA standard. HGCIBM provides the ideal solution by essentially making your Hercules card act like a CGA.

GEMCAP (Disk 1305)

Special requirements No special requirements to run GEMCAP. However, the graphics program you will be using to process the image file will have its own graphics adapter requirements.

Often, when creating a document with a desktop publishing program, you might want to incorporate graphics from another program. Perhaps you will want to incorporate a chart you created in another program, and clip art found in yet another program. Files created by some graphics programs can be imported to some desktop publishing programs some of the time. However, when the files cannot be imported, you're stuck. Other times, you might want to show exactly how the screen looks, even in text mode, in your document. GEMCAP was created to do exactly these things.

GEMCAP saves screen images to a disk file in the GEM .IMG graphics file format, a standard format that can be read by many other programs (including Ventura Publisher and WordPerfect version 5.x). It will save screen images in CGA, EGA, VGA, and text modes. In the case of text based screens, the text is converted to a bitmap and stored as a graphics image. Color images are converted to black and white.

Using GEMCAP

GEMCAP is a Terminate and Stay Resident (TSR) program. When you run it from the DOS command line, it will load itself into memory and quietly wait in the background until called into action (when the hotkey is pressed).

When you run GEMCAP, you must provide it with the location and starting filename to use to store the screen images it captures. At the DOS prompt type

GEMCAP [-R] [-U] [*d:*] [*path*] *name*A.IMG

where the parameters are

-R	Reverse video option (see the section on text modes below)
-U	Remove GEMCAP from memory
d:	Disk drive where the screen image files will be located
path	Directory path where the screen image files will be located (the path must already exist)
*name*A.IMG	DOS filename (up to seven letters) followed by the letter A, with an .IMG extension. See below for the file naming convention.

GEMCAP is now loaded into memory. When you want to save a screen image, press the hotkey, Alt-. (hold down the Alt key and press the period). This keystroke will trigger GEMCAP to save the image that is on the screen at that time. It is possible to save a screen image in either graphics mode or text mode.

Details

The first time you save a screen image, GEMCAP will use the filename you specified in the command line. Each subsequent time, GEMCAP will increment the last character in the file (the one just before the extension). The following example illustrates the way GEMCAP names image files.

```
GEMCAP C:\SCREENS\SCREENA.IMG
```

The first time you press the hotkey, the screen image will be saved to a file called SCREENA.IMG located on the C drive in the directory called

SCREENS. The second time, the file will be called SCREENB.IMG in the same directory, and so on. Note that this file naming convention limits you to 26 screen saves at a time. It is not necessary to end your initial filename with the letter A; however, using another letter will reduce the maximum number of screen saves (if you know a little about ASCII codes, you could actually increase the number by using extended characters).

If you need more than 26 screen saves, you must remove GEMCAP from memory and reload it with a different initial filename. You can remove GEMCAP from memory by running GEMCAP with a command line argument: -U.

```
GEMCAP -U
```

For this to work properly, GEMCAP must be the last TSR program loaded in memory. After removing GEMCAP, reloading it with a different filename allows you to save an additional 26 screens.

The path and filename must conform to DOS conventions. In addition, neither the path nor the filename should contain any hyphens. Having hyphens in the name will produce unpredictable results because GEMCAP will try to interpret them as command line arguments.

Always include the .IMG extension in the filename on the command line. If omitted, GEMCAP will not assume an .IMG extension, and it might not increment the filenames properly.

Whenever you press the hotkey, the computer should beep twice. A third beep indicates that GEMCAP successfully wrote an .IMG file to the specified directory. If you hear only one beep, GEMCAP was unable to create the file. This condition will occur if the directory you specified does not exist or if the last letter in the filename has incremented beyond Z. If you hear the first two beeps but not the third, GEMCAP created the file but could not write the full screen buffer. The disk might be full.

The files created are graphic bit-image files compatible with any program that reads GEM .IMG files, regardless of whether the original screen was in text mode or graphics mode. The size of the file GEMCAP creates depends on the current display mode.

Compatible video modes

GEMCAP will detect the current video mode and will adjust accordingly. It supports a variety of display adapters and different display modes:

Monochrome	Standard IBM monochrome display adapters support text modes only. GEMCAP will capture text mode displays and convert them to bitmap files. To use the resulting .IMG files, however, you must have some type of display adapter that can display graphics.
CGA	On IBM Color Graphics Adapters (CGA), the high-resolution 640×200 pixel (mode 6) is supported in addition to the various text modes.

EGA	GEMCAP can capture EGA 640×350 pixel 16-color (mode 10h) graphics screens.
VGA	GEMCAP can capture VGA 640×480 pixel 16-color (mode 12h) graphics screens.
Hercules	GEMCAP will not work on Hercules displays in graphics mode. However, it will capture text mode screens from Hercules. You can use your desktop publishing program to use the resulting GEM .IMG files with Hercules displays.

Screens in text mode

On EGA and VGA displays in text mode, GEMCAP uses the RAM resident font to convert the screen to a bitmap. The resulting bitmap represents the captured text screen exactly as it appears on the screen, even if the program loads a specialized font. With monochrome, CGA, or Hercules display adapters, an internal (within GEMCAP.COM) 8×8 pixel font is used.

Color conversion GEMCAP does not produce color GEM .IMG files. It converts color attributes to monochrome (black and white) as described below.

GEMCAP converts reverse video areas of the screen appropriately. Any color attribute combination that results in darker characters with a lighter background will be converted to reverse video. The following color attribute combinations on the captured screen will result in reverse video:

Any of these background . . .	*With these foreground*	
green	black	grey
cyan	blue	lt. blue
brown	red	lt. red
white	magenta	lt. magenta

If you wish to reverse the entire screen, for example from white on black to black on white, load GEMCAP with the command line argument -R, as shown below:

```
GEMCAP -R C:\SCREENS\SCREENA.IMG
```

GEMCAP will correctly capture different sized text mode screens. For example, it can handle EGA text mode screens with 43 lines and VGA text mode screens with 50 lines. It adjusts the internal pixel size, so screens with different numbers of lines will display with the correct aspect ratio.

Image size with Ventura Publisher and WordPerfect Note that with Ventura Publisher or WordPerfect 5.0, the size of the image when incorporated into your document is dependent on the size of the frame (VP) or figure (WP). For best results, you must adjust this size (within VP or WP) so pixels are not truncated or compressed. You can calculate the best size for the image

in your document based on the horizontal and vertical resolution of your printer.

For example, let's say you capture a VGA text mode screen that has 80 columns and 25 lines. The font size in this mode is 8 by 16 pixels; therefore, there are 400 (16×25) scan lines in the image. It is 640 pixels long horizontally (80×8). You must size the image so the number of pixels in the image is evenly divisible by the printer resolution. Therefore, if you have a laser printer or DeskJet printer that prints at a resolution of 300 dots per inch (both horizontal and vertical), a frame size of 2.13×1.33 inches or 4.27×2.67 inches would produce nondistorted output. Note that you must account for the inside border space and border width when sizing figures in WordPerfect.

Screens in graphic mode

When the screen is in a graphics mode, GEMCAP stores the image pixel by pixel in the GEM .IMG file. The most common high-resolution graphics modes of the various display adapters are supported as follows:

CGA 640×200×2 color (mode 06h)
EGA 640×350×16 color (mode 10h)
VGA 640×480×16 color (mode 12h)

Because GEMCAP does not produce color GEM .IMG files, when EGA/VGA 16 color modes are detected, GEMCAP converts the color to monochrome (black and white) as described below.

These dark colors are converted to black:

black	gray
blue	high-intensity blue
green	high-intensity green
cyan	high-intensity cyan

These light colors are converted to white:

red	high-intensity red
violet	high-intensity violet
yellow	high-intensity yellow
white	high-intensity white

The size of the GEM .IMG file will vary. GEMCAP compresses the data in the file as much as possible (for GEM .IMG file formats) by checking for duplicate scan lines in the original image. The more complex the image, the larger the file size.

Incompatibilities

Like any other TSR, GEMCAP might have compatibility problems with other software, especially other TSRs. If you have trouble, try installing

GEMCAP by itself and adding your other TSR utilities one at a time after you get GEMCAP to work.

Customizing the hotkey

Hotkey customizing is only for fearless people who don't mind poking into programs with DOS's hex editor, DEBUG. As always, when you're patching a program, be sure you have adequate backups of the original, in case something goes wrong.

If you have a conflict with other resident programs, you might need to change GEMCAP's hotkey. You must use DEBUG to make the change. There are two bytes in the GEMCAP.COM file that may be changed. The first byte represents the keyboard scan code and the second byte represents the Shift key state. The appendix shows the values for all the possible keyboard scan codes and Shift key states.

After consulting the appendix, use DEBUG to enter the values (in hexadecimal) as shown below to change the hotkey to Ctrl–Z:

```
DEBUG GEMCAP.COM
E 0103
xxxx:0103 34.2C   shows existing scan code; enter the code 2C for Z
E 0104
xxxx:0104 08.04   shows existing Shift state; enter the code 04 for Ctrl

W                 save changes
Q                 quit DEBUG
```

Registration

To register GEMCAP, contact

Natural Software
19 South Fifth Street
St. Charles, IL 60174
(708) 377-7320

HGCIBM

Special requirements You must have a Hercules graphics card to run HGCIBM.

For years, the Hercules graphics card has been one of the most popular graphics alternatives. There are a lot of them out there. Its relatively high resolution and relatively low price form a combination that many PC users find attractive. The only problem arises when you run across software that does not support the Hercules graphics standard, which happens all too

often. The worst thing is that these programs are completely worthless to you if you have a Hercules card.

There, however, is a solution to this dilemma. Because nearly all software supports the IBM Color Graphics Adapter (CGA) standard, the solution is to convert CGA graphics into Hercules graphics using HGCIBM.

Using HGCIBM

HGCIBM installs itself as a terminate and stay resident (TSR) program. It waits in memory until an application program tries to switch the display to CGA mode. To install HGCIBM, or to change modes after it has already been installed, simply type the command as shown here:

```
HGCIBM [switches]
```

where the switches are

/E	Full Hercules emulation mode
/M	Change to monochrome mode, but leave HGCIBM in memory
/C	Change to CGA mode, but leave HGCIBM in memory
/H	Use Hercules emulation mode even if a CGA is present
/L	Leading Edge mode
/U	Remove HGCIBM from memory

Details

To install the emulator, you must tell it what mode to start in and provide a little information about your hardware. There are three "modes" of operation for HGCIBM as follows:

/E The Emulate mode enables the emulator to respond to BIOS calls to set standard CGA modes and provides maximum compatibility with programs expecting to use the Color Graphics Adapter. When the emulator is in this mode, the text buffer is at segment B800 and the equipment flag is set to indicate that a CGA card is present. You can't fool all the programs all the time. Some of them read the equipment flag and try to manipulate the CRT controller directly to provide faster screen output. Naturally, the programs try to manipulate the controller at the CGA port addresses, which don't exist, and the system will hang up. A reboot will cure the problem. You then should remember to either uninstall the emulator before running these programs or place the emulator in Mono mode or CGA mode (if you have a physical CGA), as described below.

/M The Mono mode effectively disables HGCIBM without uninstalling it. The monochrome card is selected and video BIOS control returns to the computer's ROM (Read-Only Memory).

/C The CGA mode also disables HGCIBM and returns control to ROM, except that the physical Color Graphics Adapter is selected (if it exists).

There also are three installation switches available to warn HGCIBM about special hardware. During initialization, the program tries to determine if a Color Graphics Adapter is present. If it is , the program will not install unless you assure it that the Color Graphics Adapter in your system is compatible with Hercules graphics cards. If your adapter is or you have a Leading Edge computer, then you should use the following switches.

/H The Hercules compatible switch instructs HGCIBM to install and allow the emulation mode even though a Color Graphics Adapter is present. You can use this switch on installation if you have a Hercules compatible CGA card in your system. If a CGA card is present, HGCIBM will abort installation unless the /H switch is used.

Note also that some software will output to the CGA registers (3D4, 3D5, 3D8, etc.) to adjust video parameters. This output can wreak havoc on the real CGA adapter while in Emulation mode. If the CGA is not physically present, this output causes no problems and is ignored by Hercules adapters.

/L The Leading Edge switch instructs HGCIBM to install if the Leading Edge Model D is connected to a TTL display.

/U The Uninstall switch instructs the emulator to reset all vectors and remove itself from memory, freeing the space for other programs. You can uninstall the emulator provided that other programs have not altered vectors 8h and 10h. Memory can become segmented if you have loaded another resident program after HGCIBM. After the emulator is removed, the system will be left in the same condition it was in before the installation (i.e., monochrome display).

HGCIBM can be issued from a batch file, if desired. Hardware switches (/H or /L) are needed on installation only. To change modes after installation, just enter the command. HGCIBM always checks to see if it is already installed and will process the command correctly.

If you have special hardware, you can use the switches in combination as shown in the following examples:

```
HGCIBM /M
```

installs, or changes to, Mono mode (emulation disabled).

```
HGCIBM /C
```

installs, or changes to, CGA mode (emulation disabled).

```
HGCIBM /E
```

installs, or changes to, Emulation mode.

```
HGCIBM /U
```

uninstalls the emulator.

```
HGCIBM /M/H
```

informs HGCIBM that a Hercules compatible CGA is physically present.

```
HGCIBM /M/L
```

informs HGCIBM that you have a Leading Edge Model D computer.

HGCIBM supports all standard video modes. The 320×200 mode supports two intensities. Color 1 and color 2 will appear to be identical, while color 3 will be high intensity. Forty-column text is supported but will be displayed on only the left half of the screen at the same resolution as 80-column text. All four pages of 80-column text (or 8 pages of 40-column text) are available on certain Hercules cards. Some cards will display only one page.

Using the HGCTEST program

HGCTEST is provided for you to test the operation of HGCIBM with your computer configuration. Before running HGCTEST, load the emulator with the /E switch. HGCTEST.BAS runs under BASICA. Enter `BASICA HGCTEST` to run it (assuming BASICA is on the default disk drive with HGCTEST-.BAS). The program is a simple graphics demo and is selfexplanatory. If you have a BASIC compiler, the demo program can be compiled to test how well the compiler works with HGCIBM.

A warning about monochrome display damage

HGCIBM will not damage your display, but certain application software certainly can. Programs that attempt to bypass the BIOS (Basic Input/Output System) to set the CRT operating parameters will cause severe problems. Fortunately, because most software operates in standard modes, most software developers permit BIOS to set up the controller for them even if they later write to screen RAM directly.

HGCIBM will intercept the BIOS calls for all standard modes and program the controller correctly. Even when writing directly to screen RAM, the emulator will still work properly. When trying an untested program with HGCIBM for the first time, watch your display carefully for signs of gross distortion or shrinking when the program sets graphics mode. *If distortion or shrinking occurs, reboot or turn off your computer immediately.* The display should return to normal quickly when you reboot.

Registration

You can evaluate HGCIBM for 30 days, after which you are expected to register it. To register, send $10 along with any comments and suggestions to

Athena Digital
2351 College Station Road
Suite 567
Athens, GA 30605
(404) 354-4522

4
User interface

A hot topic in the PC world these days is the user interface, especially the graphical user interface. Most of us, however, are still using our text-based interfaces, and we're doing just fine. The most famous text-based interface is good old MS-DOS, or more specifically, COMMAND.COM, the DOS shell. In spite of its many shortcomings, DOS has been around for a long time and many of us have gotten used to it. However, it's safe to say that most DOS users eventually become impatient with the difficult and sometimes illogical nature of DOS. This frustration has given rise to a large number of DOS utilities on the market. Wouldn't it be nice if DOS itself were simply easier to use? You might be surprised to learn that, with 4DOS, it is.

4DOS is a truly remarkable shareware product. It is a completely MS-DOS compatible replacement for COMMAND.COM. It has all of the same commands that DOS has in a more usable form. It also offers many other useful commands that DOS does not but definitely should have.

One of the annoyances of text-based user interfaces is the need to constantly type the same commands over and over. NewKey is a program that can end all that. With NewKey, you can create your own simplified commands. One keystroke can be made to represent hundreds. NewKey is a terminate and stay resident (TSR) program that can work with any of your application programs. You could even replace all of your spreadsheet and word processor macros with NewKey macros.

Another program included in this chapter, Reconfig, fits into the category of user interfaces somewhat loosely. Reconfig resets the configuration of your system environment by creating new AUTOEXEC.BAT and CONFIG.SYS files and then rebooting your computer. There are dozens of programs on the market that do this exact same thing. Many of them have the same name. Don't confuse them; this one is the best.

4DOS (Disk 1773)

Special requirements None

4DOS is an amazing shareware product. It is a complete, full-featured DOS interface that provides all of the functions of MS-DOS's COMMAND.COM and a whole lot more. For that reason, the documentation is quite extensive. Presented here are the major features and the differences between COMMAND.COM and 4DOS, along with some examples and the installation options.

4DOS is designed to help you get the most out of your IBM PC or compatible system. It replaces COMMAND.COM, the command interpreter that comes with all versions of MS-DOS and PC-DOS.

You'll find 4DOS provides a wide variety of capabilities COMMAND .COM can't, ranging from a vastly enhanced DIR command, to point-and-shoot file selection for any command and the ability to completely redefine your system's commands. Yet, 4DOS is fully compatible with COMMAND .COM.

4DOS is a "DOS shell' (a program that gives you access to DOS functions and commands), but it's unlike most DOS shells on the market. Virtually all of these shells are designed to isolate the novice user from the DOS command line. 4DOS, on the other hand, is intended to make DOS easier to use and to make you more productive while working at the command line. It provides enhancements to most of the DOS commands, as well as more than 40 new commands. These improvements make 4DOS a much richer and more powerful working environment than COMMAND .COM, without sacrificing the compatibility, flexibility, and control you get from working at the command line. If you're tired of the limitations of COMMAND.COM, you'll love 4DOS.

4DOS features

4DOS is a complete replacement for COMMAND.COM, the command processor provided with MS-DOS or PC-DOS. (References to MS-DOS also apply to PC-DOS.) 4DOS is compatible with MS-DOS versions 2.0 to 4 and with the OS/2 DOS compatibility box and adds many enhancements to your MS-DOS prompt, including:

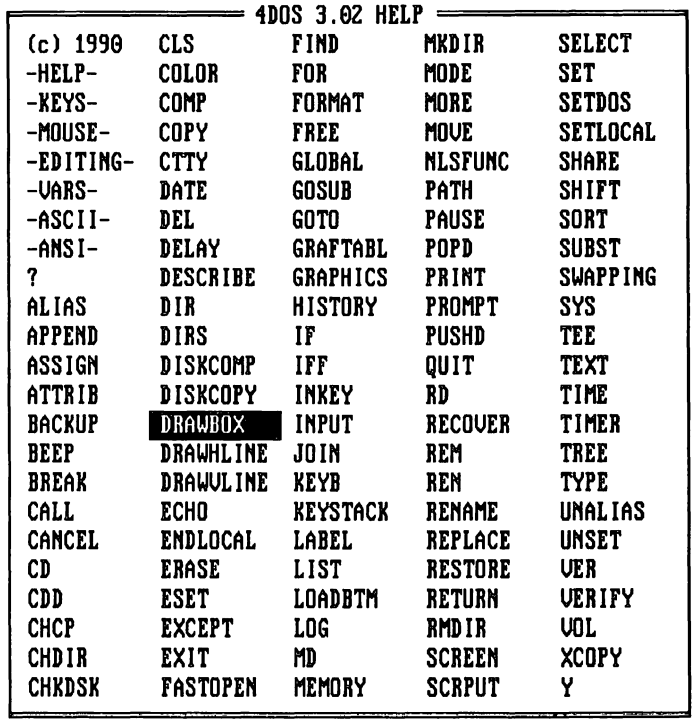
Minimal memory usage 4DOS requries less than 4K of RAM for its resident portion (less than 1K with XMS swapping) and can use EMS, XMS, or disk for swapping its transient portion.

Fast batch files 4DOS adds a new batch file extension (.BTM or "batch to memory") that is compatible with 99% of your existing batch files, but runs several times faster.

Executable extensions In addition to the normal executable file extensions (.COM, .EXE, .BAT, and .BTM), 4DOS allows you to define additional ex-

tensions and the programs they should invoke. For example, entering a document name could automatically invoke your word processor.

On-line help 4DOS provides help for all of its internal commands, as well as the MS-DOS external commands. You can get help by pressing the F1 key at the command prompt. When you do, you'll see a window pop up on the screen, as shown in FIG. 4-1. You can then use the arrow keys, or a mouse if you have one, to choose a topic off of the menu. Help screens look like the example shown in FIG. 4-2. The 4DOS help facility is expandable, so you can add help for your own programs.



4-1 Any time you press the F1 key at the 4DOS prompt, this menu will pop up.

Command line editing 4DOS provides command line editing, including insert and delete and full cursor key support. 4DOS also offers interactive expansion of wildcard filenames on the command line.

Command history 4DOS lets you view, search, modify, and re-execute your previous commands. The commands are saved in memory, and can be recalled with the cursor keys. The command history list size is user-defined, from 512 to 8192 characters.

Flexible file wildcards 4DOS offers more flexible wildcards than COMMAND.COM. For example, you can display all the files that have a "2" anywhere in their filename by entering: `dir *2*.*`

```
                              DRAWBOX                          1 of 3
SYNTAX        (Internal 4DOS)

DRAWBOX ulrow ulcol lrrow lrcol style [bright][blink] fg ON bg [FILL bgfill]

PURPOSE

Draw a box on the screen.

COMMENTS

DRAWBOX is useful for creating attractive screen displays in batch files.
DRAWBOX detects other lines and boxes on the display, and creates the
appropriate connector characters when possible (not all types of lines can
be connected with the available characters).

The row and column are zero-based, so on a standard 25 line by 80 column
display, valid rows are 0 - 24 and valid columns are 0 - 79.

The DRAWBOX parameters are:

    ulrow   Row for upper left corner
    ulcol   Column for upper left corner
    lrrow   Row for lower right corner
                                                                  PgDn
```

4-2 Choosing one of the topics from the help menu will give you a help screen like this screen.

File descriptions 4DOS allows you to provide descriptions (up to 40 characters) for each of your files and directories. The descriptions are displayed with the filenames when you use the DIR or SELECT commands. The description goes with a file when you COPY, ERASE, MOVE, or RENAME it.

Multiple commands on a single line You can enter several commands on a line by separating them with a ^(caret) or other user-defined character.

Expanded and editable environment 4DOS provides a user-defined environment size from 512 to 32000 characters. You can edit environment entries interactively with the ESET command.

Environment variables Environment variables allow you to associate a string of characters with a variable name, substituting that string when the name is used. 4DOS provides a number of predefined variables, including system date and time, current directory and default disk, and "variable functions," for returning substrings, the parts of a filename (path, name, extension), etc.

Aliases Aliases allow you to rename or reconfigure commands (for example, to pass default parameters to a command or to give MS-DOS the look and feel of a different operating system), or to define a new command as a

combination of several other commands. Aliases support batch file-like arguments (%1, %2, etc.) and environment variables. When combined with the multiple commands feature, aliases act as very fast batch files.

Expanded command line 4DOS expands the MS-DOS command input line from 127 to 255 characters for internal commands. (Because MS-DOS truncates the command line for external commands to 127 characters, 4DOS makes the full command line available to your programs through the CMDLINE environment variable.)

Conditional commands 4DOS includes two new command line operators: | | (OR) and && (AND). The operators allow you to control the execution of subsequent commands based on the result of the previous command.

Additional redirection options In addition to redirection of standard input and standard output, 4DOS supports redirection of standard error and the option to prevent overwriting existing files. 4DOS also provides TEE and Y "pipe fittings."

EGA/VGA support 4DOS supports monochrome, CGA, EGA, and VGA displays with any number of lines and columns per screen.

Networks 4DOS supports MS-DOS compatible networks, including 3Com 3+ and Novell Netware.

4DOS commands

4DOS has more than 70 internal commands. Some are the same as, or improvements of, those in COMMAND.COM. The remainder are new commands.

These commands are equivalent to those in COMMAND.COM:

BREAK	CHCP	CTTY	DATE
EXIT	GOTO	TIME	VER
VERIFY			

These commands are enhanced:

CD	CHDIR	CLS	COPY
DEL	DIR	ECHO	ERASE
FOR	IF	MD	MKDIR
PATH	PAUSE	PROMPT	RD
REM	REN	RENAME	RMDIR
SET	SHIFT	TYPE	VOL

These commands are new:

?	ALIAS	ATTRIB	BEEP
CALL	CANCEL	CDD	COLOR
DESCRIBE	DIRS	DRAWBOX	DRAWHLINE
DRAWVLINE	ENDLOCAL	ESET	EXCEPT

FREE	GLOBAL	GOSUB	HISTORY
IFF	INKEY	INPUT	KEYSTACK
LIST	LOG	MEMORY	MOVE
POPD	PUSHD	QUIT	RETURN
SCREEN	SCRPUT	SELECT	SETDOS
SETLOCAL	SWAPPING	TEE	TEXT
TIMER	UNALIAS	UNSET	Y

Most 4DOS commands can take multiple arguments. For example, the following command deletes all files with the .bak extension plus test.wks and oldfile.txt:

```
DEL *.BAK TEST.WKS OLDFILE.TXT
```

You also can copy several files with a single COPY command (the target directory here is A:\):

```
COPY *.WKS MEMO.DOC *.C A:\
```

The following list is intended to give you a sampling of some of the new and enhanced commands.

ALIAS/UNALIAS Define aliases for commonly used commands, allowing you to execute a complex series of commands with a few keystrokes.

ATTRIB Display or change the file attributes (read-only, hidden, system, and archive) for the specified files and/or directories.

CDD change the default drive and directory.

COLOR Set the screen foreground and background colors.

COPY COPY includes new switches for copying only updated files (where the source is newer than the target) and to prompt for confirmation before overwriting existing files.

DESCRIBE Add 40-character descriptions to filenames. The descriptions are displayed when using DIR and SELECT.

DIR Display the disk directory with a wide variety of options, including 1, 2, 4, or 5 column display; sorted by name, extension, description, size, or date/time; display subdirectories; display file attributes; and display subtotals only.

ESET Interactively edit environment variables and aliases.

EXCEPT Execute a command except on the specified file(s).

FREE Display the total and free disk space for the specified drive(s).

GLOBAL Execute a command in the current directory and all of its subdirectores.

HELP Display a pop-up help window for 4DOS internal commands and MS-DOS external commands.

HISTORY Display, clear, or load the command history list.

LIST Display a file on the screen. LIST provides forward and backward paging, vertical and horizontal scrolling, text search, and printing.

LOG Keep a disk log of each command executed, with the date and time.

MEMORY Display the amount of total and available DOS, expanded, XMS, and extended memory, and environment space.

MOVE Move files between directories and/or drives, and optionally prompt before overwriting existing files.

PUSHD/POPD/DIRS Use a "directory stack" to change directories, perform some work, and then return to the original directory.

RENAME In addition to renaming files, 4DOS also allows you to rename files to another directory and to rename directories.

SELECT Perform a command on selected files (using point-and-shoot selection).

SETDOS Configure the 4DOS internal parameters, including the default line editing mode (insert or overstrike), the default batch echo mode, the compound command character, the escape character, screen size, and cursor shape.

TIMER A system stopwatch for timing events, including split times.

Enhanced batch processor

The batch processor in 4DOS is compatible with batch files written for COMMAND.COM. The processor also includes several new and enhanced commands to make batch file programming easier and more powerful, including:

BEEP Beep the speaker at the specified frequency and for the specified duration.

CALL Execute nested batch files without loading a secondary copy of the command processor.

CANCEL Terminate nested batch file processing.

DELAY Wait for the specified period of time before continuing batch processing.

DRAWBOX/DRAWHLINE/DRAWVLINE Draw boxes, and horizontal and vertical lines in single or double widths, in your choice of colors. These commands automatically make connectors when crossing other lines.

GOSUB/RETURN Call subroutines within a batch file.

IF Many new comparison tests (including less than, greater than, etc.) and tests for memory, disk, and display type.

IFF/THEN/ELSEIFF/ELSE/ENDIFF Allows nested IF/THEN/ELSE tests in batch files and aliases, and supports all of the new IF tests.

INPUT/INKEY Input variables from the keyboard while in a batch file, with an optional timeout period.

KEYSTACK Send keystrokes to a program, as if entered from the keyboard.

QUIT Exit the current batch file.

SCREEN Position the cursor and (optionally) display text.

SCRPUT Position the cursor and display text in the specified colors.

SETLOCAL/ENDLOCAL Define a local environment within a batch file, saving the original environment, disk, and directory, and restoring them when finished.

SHIFT Optionally specify how many positions to shift, including reverse SHIFTs.

TEXT/ENDTEXT Display a block of text.

Test driving 4DOS

While 4DOS normally is installed as your system's primary command processor, you can try it out by running it just like any other program. Running 4DOS before you install it allows you to explore the features and advantages of 4DOS before doing a full installation.

To try 4DOS, copy the files 4DOS.COM and 4DOS88.EXE to your system disk. You can put these files in any directory, including a separate 4DOS directory if you like. Change to that directory and enter the command:

```
4DOS
```

You will see the 4DOS sign-on message and a prompt. You now are ready to try 4DOS. You can return to COMMAND.COM at any time by typing:

```
EXIT
```

Note that the 4DOS KEYSTACK command will be unavailable because it requires the KEYSTACK.SYS device driver to be installed. Installation of KEYSTACK.SYS is described in the "Manual installation" section.

The 4DOS HELP command also will be unavailable. To try it out, decompress and/or copy the files HELP.EXE and DOS.HLP to a directory included in your PATH statement. Then, type `HELP` or press F1 at the 4DOS prompt to access the 4DOS online help facility.

There are a few situations where you will need to make some changes in the method described above. If your system does not have a hard disk, EMS, or XMS memory, use the following command to start 4DOS:

```
4DOS /s:n
```

This command will disable 4DOS swapping (floppy disk swapping is too slow to be useful). Under these conditions 4DOS will require about 70K of memory, instead of less than 4K required in swapping mode.

Manual installation

If you are an experienced MS-DOS user, the following instructions will get you up and running with 4DOS. If you have trouble or if these instructions

don't make sense, use the automatic installation procedure described in the next section. These instructions assume you are booting from a hard disk which is drive C.

- ☐ Be sure you have a bootable MS-DOS floppy.
- ☐ Copy the files 4DOS.COM, KEYSTACK.SYS, and 4DOS286.EXE (for 8018x/286/386/486, V20, and V30 processors) or 4DOS88.EXE (for 808x processors) to the root directory of drive C:. Note that 4DOS88.EXE will work with the same processors as 4DOS286.EXE.
- ☐ Copy the files HELP.EXE and DOS.HLP to a directory included in your PATH statement.
- ☐ Edit CONFIG.SYS so it contains the following lines (delete any existing SHELL command):

  ```
  DEVICE=C:\KEYSTACK.SYS
  SHELL=C:\4DOS.COM /E:n /A:m /P
  ```

  where *n* is your desired environment size, and *m* is the desired alias list size (in bytes). The default values are /E:512 and /A:1024.
- ☐ Reboot your system. The system will load 4DOS (swapping to XMS, EMS, or disk, depending on what is available), execute AUTO EXEC, and return to the 4DOS prompt when AUTOEXEC is done.
- ☐ If you are using PROMPT commands in AUTOEXEC to transmit ANSI control sequences for key redefinitions, they will not work with 4DOS. You must use ECHO instead. ANSI control sequences for the prompt itself (to set colors, etc.) will work properly.
- ☐ If you are explicitly setting COMSPEC in AUTOEXEC, you should delete this line or place a REM in front of it if you want to use 4DOS as your secondary shell. 4DOS will automatically set the COMSPEC to C:\4DOS.COM.

Automatic installation

If you feel uncomfortable with the above procedure, 4DOS provides an installation utility. To install 4DOS automatically from a diskette in drive A: to a hard disk configured as drive C:, insert the 4DOS Shareware Disk in drive A: and type:

```
A:INSTALL
```

If you need to install from a drive other than drive A: or to a drive other than drive C:, use the following command:

x:INSTALL *x y*

where *x* is the drive containing the 4DOS shareware disk, and *y* is the drive where you want to place the installed copy of 4DOS.

INSTALL will prompt you for your desired configuration, copy the necessary files to your boot disk, and create some new lines for CONFIG.SYS.

These new lines, in the file CONFIG.4D, must be merged with your existing CONFIG.SYS file before rebooting your system to start 4DOS.

Note: You might want to edit the new CONFIG.SYS lines, if you have an unusual configuration or if you want to modify the default values.

DOS shells explained

In the PC world, the term "shell" has come to mean any program that gives you the capability to execute DOS commands and run programs. We will use the term more precisely to mean the system command interpreter (the program that reads your keystrokes at the DOS prompt and interprets them, allowing you to execute internal commands and run external programs). Before 4DOS, virtually all PCs using DOS used COMMAND.COM as the shell.

When your system is started, the last thing the system startup software does is to load a copy of the shell program into memory and to give the shell control. This program is called the primary or root shell. The shell executes AUTOEXEC.BAT, displays the command line prompt, and processes your commands.

The primary shell is the program that executes most of the commands you enter, either as internal functions (e.g., the DIR command) or by loading and executing other programs (e.g., a word processing program).

The text file, CONFIG.SYS, stored in the root directory of your boot disk tells MS-DOS how to start: what device drivers to load, how many open files to allow, etc. The SHELL statement in CONFIG.SYS determines what program is loaded as the primary shell. If you don't have a SHELL statement, MS-DOS will load COMMAND.COM as the primary shell. However, any properly written program can be loaded in place of COMMAND .COM. Using the SHELL statement is the normal method for loading 4DOS.

Now, suppose from inside your word processor you invoke the "shell to DOS" option, to execute some commands without having to save your files and exit first. When the prompt comes up, you are running a secondary shell; the word processor has loaded a shell program into memory to perform commands. When you type the EXIT command, the secondary shell terminates and control is returned to the word processor.

The same kind of sequence is used by many programs that run other programs or execute MS-DOS commands. The program loads a copy of the command processor (a secondary shell) and passes a command to the secondary shell to execute a command or another program. For example, a hard disk manager that allows you to copy files might invoke a secondary shell and pass a COPY command to it to actually perform the copy.

Multitasking or task switching systems also might use secondary shells to load and execute the programs you specify in each of the windows or partitions they support. For example, DESQview will load a secondary

shell to execute your program under some conditions and will execute the program directly under other conditions (see the DESQview manual for details).

In all of these situations, the secondary shell need not be the same program as the primary shell. The two shells are completely independent, occupy different areas of memory, and generally have little interaction with each other. Both COMMAND.COM and 4DOS can work as primary and/or secondary shells.

The COMSPEC environment variable

A variable in the MS-DOS environment, COMSPEC, determines which program is loaded as the secondary shell, just as the SHELL command in CONFIG.SYS specifies the primary shell program. The COMSPEC variable is set at startup time to point to the primary shell program. COMSPEC can be modified at any time with the SET command. If COMSPEC does not point to a valid command processor (including the correct drive and directory), programs attempting to shell to MS-DOS will fail.

In 4DOS, COMSPEC is set at system startup to *d*:\4DOS.COM, where *d*: represents the drive the system was started from. In COMMAND.COM, COMSPEC is set to *d*:\COMMAND.COM.

If 4DOS is your primary shell and 4DOS.COM and 4DOS88.EXE (or 4DOS286.EXE) are not stored in the root directory of the boot drive, you must set COMSPEC yourself in AUTOEXEC.BAT with the proper drive and directory for 4DOS.COM and the 4DOS EXE files. If COMSPEC is not set correctly, you will not be able to shell out to 4DOS or execute external commands from within your application programs. For example, if your 4DOS .COM and 4DOS88.EXE or 4DOS286.EXE files are in D:\BIN\4DOS, put the following command in AUTOEXEC.BAT:

```
SET COMSPEC=D:\BIN\4DOS\4DOS.COM
```

Note that COMSPEC contains only the name of the shell program. Any options to be passed to secondary 4DOS shells must be set separately in 4DSHELL.

4DOS memory usage

When installing 4DOS, you must decide whether you want to run it in swapping mode or memory-resident mode.

Swapping mode is recommended for most users. In this mode, a small part of 4DOS (the resident portion, less than 4K in size, from the file 4DOS .COM) resides permanently in low memory. The remainder of 4DOS (the transient portion, about 70K in size, from the file 4DOS88.EXE or 4DOS286.EXE) resides at the end of normal MS-DOS memory and is swapped out to XMS, EMS, or disk while your applications are running. This swapping is very fast, especially if XMS or EMS memory or a RAM

disk is available. It allows you to have the power of 4DOS, yet keep most of your memory available for applications.

COMMAND.COM uses a similar approach to keep its resident portion in low memory and its transient portion at the end of DOS memory. It does not retain information while applications are running, so it does not use a swap area. The resident portion of COMMAND.COM is slightly larger than that of 4DOS. The transient portion is smaller (about 35K) because COMMAND.COM has far fewer features and capabilities than 4DOS.

The resident portion of 4DOS takes about 10K of memory to load (later reduced to less than 4K), and the transient portion takes 70K, so you must have about 80K of free memory to load 4DOS in swapping mode (82K for 4DOS88).

COMMAND.COM requires about 40K of free memory to load. If you find you are able to load COMMAND.COM as the secondary shell from a particular program but are unable to load 4DOS, it is probably because you have more than 40K but less than 80K of free memory, or because `COMSPEC` and/or `4DSHELL` are set incorrectly.

Memory-resident mode is recommended only on systems (older PCs and some laptops) that have no hard disk, XMS or EMS memory, or RAM disk. On such systems, the only swap area available is a floppy disk, which is unacceptably slow. In memory-resident mode, all of 4DOS is loaded permanently into low memory. The memory required is about 70K for 4DOS 286.EXE, or 72K for 4DOS88.EXE.

Setting up CONFIG.SYS

In order to install 4DOS, you must modify the CONFIG.SYS file. First, create a SHELL command to tell MS-DOS to load 4DOS as the command processor. The format of the command is:

`SHELL=`*`d`*`:\`*`path`*`\`*`filename`* `[`*`options`*`]`

where *`d`*`:\`*`path`* is the drive and directory where the primary shell program is stored, *filename* is the full name of that program, and `[`*`options`*`]` is any option or parameter values for 4DOS. (See "4DOS startup options.") The options are passed to the program just as if they had been typed on the command line.

When loading 4DOS, the filename part of the command should be 4DOS.COM. For example, the simplest SHELL command that will load 4DOS properly is:

```
SHELL=C:\4DOS.COM /P
```

This command loads 4DOS in swapping mode (4DOS determines the optimal swapping method), with default sizes for the environment, alias list, and history list. The /P tells 4DOS it is the primary shell.

Use an editor to edit or create your CONFIG.SYS file, and set up your SHELL command as shown above, along with any additional options you

need (see the next section). If you already have a SHELL command for COMMAND.COM, remove it. Examples of SHELL commands for different systems are given in "4DOS startup options."

In addition to the shell command, if you want to use the 4DOS KEYSTACK command (see the section on KEYSTACK), you must place a line in CONFIG.SYS to load the 4DOS KEYSTACK device driver. This line should read:

```
DEVICE=C:\KEYSTACK.SYS
```

4DOS startup options

This section describes the options that can be included with the SHELL command in CONFIG.SYS and/or used for secondary shells (see 4DSHELL). The same options also can be used when you start 4DOS in a window of a multitasking or task switching environment, such as DESQview or Windows, or from the command line or a batch file.

```
SHELL=[d:] [path]4DOS.COM [options]
```

where *d:* and *path* are the disk and directory path where 4DOS is located. The options are explained below.

@d:*path**filename* Stop processing input from the command line and switch to the specified file. Any characters on the line after this option will be ignored. The file can contain any number of lines specifying additional 4DOS options and can be up to a total of 255 characters long. This option allows you to get around the 33-character limit on options in the SHELL command by placing 4DOS options in a separate file.

/A:*n* Set the alias list size. The range of allowable alias list sizes for all shells is 256 to 32,000 bytes. The default value for all shells is /A:1024. The incremental syntax shown with /E below (/E+n) also can be used with /A.

/C *cmd* Load a transient copy of 4DOS, execute *cmd*, and then return to the parent command processor. This option is used by some application programs to start the command processor, execute a command, and automatically return to the program. It should never be used in the SHELL statement.

/E Set the environment size. The range of allowable environment sizes for all shells is 256 to 32,000 bytes. There are two formats for this option:

/E:*n* *n* is the size of the environment in bytes. The default for the primary shell is /E:512.

/E+*n* Set the environment size to the amount of space previously used, plus *n* bytes. This option allows you to guarantee a certain amount of free space in a secondary shell environment. The default for secondary shells is /E+128; the minimum increment allowed is 128 bytes.

With either format, appending a U after the size (for example, /E:512U) will cause 4DOS to load the master environment into an XMS UMB. (See the /U option for more information on UMBs.) Loading the environment into an XMS UMB reduces low-memory requirements, but might not be compatible with some programs that access the master environment. If no UMB is available, 4DOS displays an error message and the environment is put into low memory.

Appending an S after the size will swap the master copy of the environment. Swapping the master copy will save a small amount of DOS memory, but will not work with any application that attempts to modify the master environment (for example, Novell Netware). 4DOS always will ensure that there is at least 128 bytes free in a secondary shell environment and will override your /E parameter if necessary.

/H:*n* Set the history size, where *n* is the size of the history list. (The default is 1024 bytes; the range is 512 to 8192 bytes.)

/L:*d*:*path* Tells 4DOS where to find 4DOS88.EXE (or 4DOS286.EXE). The default is the root directory of the boot drive for the primary shell and the path specified by COMSPEC for secondary shells. You must use this switch if the .EXE file is not in the default location.

/P Load 4DOS permanently and run AUTOEXEC.BAT. 4DOS will not run AUTOEXEC.BAT without /P. This option can be placed anywhere in the SHELL command, but it normally appears as the last option. Do not use this option for secondary shells, or you will be unable to return to the primary shell.

/S Set the 4DOS swapping mode, as follows:

/S:B[*d*:*path*] Best guess swapping (default mode). 4DOS first tries XMS memory swapping (on an 80286 or 80386), then EMS, then disk swapping to the specified drive and directory. Disk swapping filenames and defaults are as described for /S:D below.

/S:D[*d*:*path*] Swap to disk. Creates a file 4DOSSWAP.*xxx* where *xxx* is the current shell nesting level (000 for the primary shell). If the drive and path are not specified, disk swapping will default to the root directory of the boot drive for the primary shell and to the root directory of the drive specified in COMSPEC for secondary shells.

/S:E Swap to EMS memory. EMS swapping requires a minimum of 80K free EMS memory for the primary shell, and 32K for most secondary shells. Large environment, alias list, and history sizes will require more.

/S:N Load 4DOS in memory-resident mode (no swapping).

/S:X Swap to XMS (extended) memory. XMS swapping requires an XMS device driver and a minimum of 70K of free XMS memory. Large environment, alias list, and history sizes will require more.

If 4DOS can't access EMS or XMS memory or create the disk swap file, it will load with swapping disabled (memory-resident mode). 4DOS displays the type of swapping (XMS, EMS, or disk) and the amount of swapping space used when it starts.

If possible, 4DOS will reduce the space used to swap a secondary shell from 68K or more to about 20K by retrieving static information from the primary shell's swap area. This feature will not work if the total of alias, history, and environment sizes in the secondary shell is larger than the total for the primary shell or if the size of DOS memory was reduced when the secondary shell was started (e.g., by a program like DESQView that reserves some space at the top end of DOS memory).

/U Move the resident portion of 4DOS to an XMS Upper Memory Block (UMB). Moving the resident portion reduces the size of the resident portion in low memory from about 3K to 256 bytes (plus the environment size). This option can be used only on 286 and 386 systems with software that can map memory into the 640K to 1Mb area and have 3K or more of free space in that area and that include an XMS driver. XMS swapping can be used for the rest of 4DOS via /S:X, but is not required for /U to work. If the UMB load fails, the load will continue, with the resident portion of 4DOS remaining in low memory. See COMPAT.DOC for up-to-date information on the memory management software needed to enable /U to work.

Any text on the 4DOS command line (including the SHELL command) following the final option will be interpreted as a startup program command. This feature allows you to directly load a program without running AUTOEXEC.BAT (and giving the user the opportunity to break out to the MS-DOS prompt with a Ctrl-C).

For example, to load 4DOS in EMS swapping mode with a 2048 character alias list and a 2048 character command history:

```
SHELL=C:\4DOS.COM /S:E /A:2048 /H:2048 /P
```

To load 4DOS with a 2048 character environment in disk swapping mode, swapping to a RAM disk defined as F:

```
SHELL=C:\4DOS.COM /S:DF:\ /E:2048 /P
```

To load 4DOS in the "best available" swapping mode, using drive G for disk swapping if necessary, loading the .COM and .EXE files from the directory D:\BIN\4DOS (with a 1024-character environment, a 4096-character alias list, and a 2048-character history and the low-memory code moved to a UMB if possible):

```
SHELL=D:\BIN\4DOS.COM.@d:\BIN\4DOS\4DOS.OPT
```

The file D:\BIN\4DOS\4DOS.OPT would contain:

```
/S:BG:\ /l:D:\BIN\4DOS /E:1024 /A:4096 /H:2048 /U /P
```

To load 4DOS in XMS swapping mode, with default history and environment, and run a program called C:\UTIL\MYSHELL automatically after the AUTOEXEC file (if any) is completed:

```
SHELL=C:\4DOS.COM /S:X /P C:\UTIL\MYSHELL
```

The 4DOS EXE file (4DOS88 or 4DOS286) can be loaded directly as the primary shell, by using it as the filename in the SHELL command. The EXE file can be loaded as the secondary shell, by using it as the filename in COMSPEC. For example:

```
SHELL=C:\4DOS286.EXE /E:2048 /P
```

When the EXE file is loaded directly, rather than via 4DOS.COM, 4DOS will be in memory-resident mode. The only options permitted are /A:*n*, /E:*n*, /H:*n*, /C, and /P. Aliases will not be inherited from a previous shell.

This method of loading 4DOS is not recommended in most circumstances. To load in memory-resident mode, use the /S:N option instead. However, you might wish to use it to conserve disk space (for example, on a laptop with no hard disk) as it does not require 4DOS.COM to be on your disk.

The 4DSHELL environment variable

When loading the primary shell, both the shell name and options are specified by the SHELL command in CONFIG.SYS. For secondary shells, COMSPEC specifies the shell name, but not the options. 4DSHELL is an environment variable, used by 4DOS to set the options for secondary shells. If 4DSHELL is not defined, secondary shells will use default values for their options. If options are set on the command line, they will override those in 4DSHELL.

4DSHELL should normally be set in AUTOEXEC.BAT. It can contain any of the options listed in "4DOS startup options," except /C and /P. If the 4DOS EXE file is not in the directory specified by COMSPEC, you must use the /L option in 4DSHELL or the secondary shells will not start properly.

The following examples show the use of both COMSPEC and 4DSHELL to configure your system properly for secondary shell operation.

To load 4DOS.COM and the EXE file from C:\, use EMS swapping in secondary shells, and guarantee 512 bytes of free environment space:

```
[no COMSPEC setting necessary]
SET 4DSHELL=/S:E /E+512
```

To load 4DOS.COM from C:\BIN and the 4DOS EXE file from D:\BIN, use best guess swapping (default), and move the resident portion of secondary shells to an XMS UMB if possible:

```
SET COMSPEC=C:\BIN\4DOS.COM
SET 4DSHELL=/L:D:\BIN /U
```

AUTOEXEC and 4START

The AUTOEXEC.BAT file contains DOS commands to be executed automatically by the primary shell when it starts. The batch file is executed before you are given control at the prompt. The /P switch must be in the SHELL command in CONFIG.SYS for AUTOEXEC.BAT to be executed. AUTOEXEC cannot be a .BTM file.

If you do not have an AUTOEXEC.BAT file, COMMAND.COM will prompt you for the current date and time. 4DOS will not; it will simply transfer you immediately to the 4DOS prompt.

4START is an optional batch (.BAT or .BTM) file of 4DOS commands to be executed whenever 4DOS is started, whether as a primary or secondary shell. 4START is a convenient place to put configuration commands, such as SETDOS, to make 4DOS operate in the mode you want (regardless of whether you are in a primary or secondary shell). In the primary shell, 4START is executed before AUTOEXEC.BAT.

You should not load any memory-resident programs (TSRs) from the 4START file, because 4DOS will attempt to load them every time it starts a new shell. You also shouldn't load aliases from 4START, because 4DOS will pass them automatically to secondary shells.

4DOS details

The sections below review 4DOS features in a little more detail, and provide some examples of how 4DOS can help improve your productivity and make your computer easier to use. The following sections also document the features of 4DOS that are not related to specific commands, such as command line editing, command history, command syntax, and batch files.

Starting 4DOS Whenever 4DOS is loaded, it searches the boot directory for the file 4START.BTM or 4START.BAT, and executes the file, if it is found. If 4DOS is started with the /P option, it will then execute AUTOEXEC.BAT.

Because 4START is always executed when 4DOS starts, it provides a convenient place to put the 4DOS configuration commands (for example, SETDOS parameters) that would otherwise not be set when executing a secondary copy of 4DOS. (For example, when shelling out to MS-DOS from within a program.)

When setting up 4START and AUTOEXEC.BAT, you should break up the work to be done into smaller batch files. In particular, if you put the aliases and environment variables into separate batch files and use CALL to invoke them, you can edit and reinvoke them later without having to reboot the system.

Command history and recall 4DOS saves each command into the command history list as it is entered (except when executing a batch file), allowing you to display, recall, search, and modify previous commands.

The history list size is determined by the /H parameter at startup time. The history is a circular list. When the history list is full, 4DOS discards the oldest command (s) before adding the newest.

The command history list can be displayed or cleared with the HISTORY command. The /H option in SETDOS allows you to enable or disable the history saves and to specify a minimum length to save. You can prevent a command line from being saved in the history list by beginning it with an @.

The simplest use of the command history is to repeat commands exactly. For example, you might enter the command:

```
DIR /2P B:*.WKS B:*.DOC
```

and then move some files to or from drive B. When you're through, you want to repeat the DIR command. Just press the up arrow repeatedly to scan back through the history list. When the DIR command appears, press Enter to re-execute it.

After you've found the command, you also can edit it before pressing Enter. This feature provides a simple means of executing a series of commands that differ only slightly from each other.

Another powerful feature is command completion, which searches the command history for the last command that begins with the characters you entered. In the above example, you can quickly recall the DIR command by typing `DI` and pressing the up arrow. 4DOS will display the most recent command in the history list that begins with DI. Pressing the up arrow again will display the next most recent match. Typing `DI` and pressing the down arrow key instead would search for the oldest matching command in the history list. 4DOS will beep if there are no matching commands.

4DOS also offers filename completion. For example, suppose you want to copy a file. You remember that the name starts with AU, but you can't remember the rest. Enter:

```
COPY AU
```

and press the F9 key. The first filename that starts with AU will be inserted in the command line. If it's the right file, simply complete your command. If it's not, press F9 again to substitute the next matching filename. If you go past the filename(s) you wanted, pressing the F8 key will return the previous matching filename. The F10 key saves the current filename and then appends the next matching filename to the command line. You can use the wildcard characters (* and ?) in the filename. 4DOS will beep when there are no more matching filenames.

Multiple commands You can enter multiple commands on a single line. The default command separator is a caret (^). For example, the following command displays a directory and then copies files to the root directory on drive A:

```
DIR *BAT ^ COPY *.BAT A:\
```

The command separator character can be changed by setting the COMPOUND variable (see the SETDOS command in the Command Reference Guide).

Conditional commands When an internal or external command finishes, it returns a result, called the exit code. The conditional commands allow you to perform tasks based upon the previous command's exit code.

If two commands are separated by && (AND), the second command will be executed only if the first returns an exit code of 0. If two commands are separated by || (OR), the second command will be executed only if the first returns a nonzero exit code.

Note: All 4DOS internal commands return an exit code (0 if successful, or nonzero for an error return), but not all external programs do. Conditional command behavior will be unpredictable for programs that don't explicitly return an exit code.

For example, if the BACKUP operation fails, the files will not be erased:

```
BACKUP C:\ A: /S && GLOBAL ERASE *.BAK *.LST
```

If the BACKUP operation fails, then ECHO will display a message:

```
BACKUP C:\ A: /S || ECHO Error in the backup!
```

Batch files COMMAND.COM executes batch files by opening the file, reading one line, saving the position, closing the file, executing the line, opening the file, moving to the saved position, reading the next line, etc. This scheme has two advantages: batch files can modify themselves dynamically, and they can extend across multiple disks. It also has one disadvantage: batch files run slowly.

For the sake of compatibility, 4DOS processes .BAT files the same way. 4DOS, however, also offers a much faster approach, called Batch to Memory (.BTM). Because a .BTM file is loaded entirely into RAM before it is executed (requiring only one disk access), .BTM files run two to five times faster than .BAT files (even faster on floppy disks). For small batch files the difference between .BAT and .BTM files will be negligible, but for large files or ones with loops, a .BTM will run nearly as fast as an alias. Most .BAT files can be renamed to a .BTM extension and immediately realize a significant performance improvement.

You should not use a .BTM file (or a .BAT file that is called from a .BTM file) to load memory-resident (TSR) programs. If you do, the memory used for the .BTM file will be located below the TSR. When the .BTM file exits, this memory will be freed and you will be left with a "hole" in memory. This hole is not harmful, but it wastes memory.

4DOS also offers an additional "Cancel ALL" option for Ctrl-C handling in batch files. If your press Ctrl-C or Ctrl-Break while in a batch file, 4DOS will prompt:

```
Cancel batch job? (Y/N/A):
```

Pressing N will continue batch processing at the next line. Pressing Y will end the current batch file and return to the calling batch file (if any). Pressing A will cancel all batch file processing, regardless of the nesting level and will return to the command prompt.

Batch file variables Batch file variables are active only inside a batch file. They are referenced as %0 to %127 and expand to the matching argument on the command line that started the batch file. The parameter %*n*& is a special case and expands to all arguments in the command line tail, starting at argument number, *n*. If *n* is not specified, it defaults to 1 (so %& expands to all arguments in the command line tail). The batch variable %# expands to the number of command line arguments, not including %0 (the batch filename). Note that the SHIFT command will shift both the numbered variables (%0, %1, etc.) and the %*n*& and %# variables.

Aliases Much of the power of 4DOS comes together when using aliases. An alias is a new name for a command or combination of commands. Aliases are defined with the ALIAS command and removed with the UNALIAS command. Aliases are expanded before the command line is broken up for multiple commands, redirection, and conditional commands. Aliases can be nested (i.e., an alias can refer to another alias), but they cannot refer back to themselves. The alias name is limited to no more than 80 characters, and the alias argument to no more than 255 characters.

The simplest type of alias is to give a new name to an existing command. For example:

```
ALIAS UP CD ..
```

defines the alias UP to mean "change to the parent directory." Aliases also can create a customized version of a command. For example, the 4DOS DIR command allows a directory to be sorted in various ways. The alias:

```
ALIAS DE DIR /OE /P
```

defines the alias DE to mean "sort the directory by extension, pausing after each page."

Aliases can be used to execute multiple commands. When used this way, they act like very fast, in-memory batch files. For example, entering the command:

```
ALIAS W 'PUSHD C:\WP ^ WP %& ^ POPD'
```

defines the alias W to mean "save the current directory, change to the WP directory on C, run the WP program passing it all of the arguments on the command line following the alias name, and when finished, restore the original directory." The back quotes are required to tell 4DOS that this string is a single alias with three commands, rather than three commands on a single line (see "Multiple commands").

You can stop alias expansion by prefacing the alias with an asterisk (*). This feature allows you to use aliases to define commands as variations of themselves or to rename internal commands to avoid conflicts with external programs. For example, the alias definition:

```
ALIAS GLOBAL GLOBAL /I
```

will fail with an "alias loop" error message, but the alias:

```
ALIAS GLOBAL *GLOBAL /I
```

will work properly. You also can use this feature to rename a 4DOS internal command (for example, if you have an external program of the same name). The following alias definitions rename the LIST command to DISPLAY, and call an external program for LIST:

```
ALIAS DISPLAY *LIST
ALIAS LIST C:\UTIL\LIST.COM
```

Alias names can be truncated by including an asterisk (*) in the alias name. For example, if you have an alias defined as:

```
ALIAS WHER*EIS DIR /DP
```

you can refer to it as `WHER`, `WHERE`, `WHEREI`, or `WHEREIS`.

Alias definitions can include replaceable parameters, like those in batch files. Alias parameters are referenced as `%1` to `%127` and expand to the matching command line argument. The parameter `%`*n*`&` is a special case and expands to all arguments in the command line tail, starting at argument number, *n*. If *n* is not specified, it defaults to 1 (so `%&` expands to all arguments in the command line tail).

If an alias has replaceable parameters, 4DOS will delete command line arguments up to and including the highest referenced argument. For example, if you have an alias that refers only to `%1` and `%4`, then the first and fourth arguments passed to the alias will be used, the second and third arguments will be discarded, and any additional arguments beyond the fourth will be appended to the end of the alias. If an alias has no replaceable parameters, all of the command line arguments will be appended to the alias.

For example, the following alias will change directories, perform a command, and return to the original directory:

```
ALIAS IN 'PUSHD %1 ^ %2& ^ POPD'
```

when this alias is invoked with:

```
IN C:\COMM MYCOMM /XMODEM /2400
```

it is expanded into the following three commands:

```
PUSHD C:\COMM
MYCOMM /XMODEM /2400
POPD
```

Keystack The KEYSTACK command can be used in aliases and batch files to feed keystrokes to application programs. The most common use of KEYSTACK is to have a program take certain actions when it starts. For example, when the alias (this command should be entered on one line):

```
ALIAS 321 'KEYSTACK 0 13 0 13 0 13 0 13 0 13 "/fr" 0 "%1" 13 ^
123'
```

Note that the number 13 is the ASCII code representing the Enter key. To execute the alias, type:

```
321 FEBRUARY
```

This command will load Lotus 1-2-3, skip the startup screens, and load the spreadsheet FEBRUARY.WK1.

KEYSTACK can store up to 255 characters, enough keystrokes to cause a program to do an entire operation and exit. For example, the following alias DRPT will run a dBASE report called TIMEREP in the directory DATA (this command should be entered on one line):

```
ALIAS DRPT 'PUSHD C:\DATA ^ KEYSTACK "use times index
times" 13 "report form timerep to print" 13 "quit" 13 ^
DBASE ^ POPD'
```

KEYSTACK.SYS is a small device driver invoked in your CONFIG.SYS file (see "Manual installation") and used to support the KEYSTACK command. You must have KEYSTACK.SYS installed to use the KEYSTACK command.

4DOS compatibility with COMMAND.COM 4DOS is designed to be 99% compatible with the standard MS-DOS command interpreter, COMMAND .COM. In virtually all cases, commands will work identically under 4DOS and COMMAND.COM. However, 4DOS has improved on COMMAND.COM in a number of areas, and on rare occasions these improvements produce a conflict.

In some cases, 4DOS command output differs from COMMAND.COM in order to provide enhancements. For example, the default DIR display is in alphabetical order, rather than physical order as in COMMAND.COM. The filenames also are in lowercase, rather than uppercase. With DIR, as in most such cases, command options allow you to specify output that is closer to or exactly the same as COMMAND.COM.

COMMAND.COM also contains bugs or quirks that are not part of its documented behavior, and some programmers and users have chosen to rely on these bugs and quirks in writing their batch files and programs. 4DOS does not emulate some of these quirks. In some cases, to do so would be wrong; in others, it would hinder useful features of 4DOS.

The only specific known compatibility difference between 4DOS and COMMAND.COM that is unrelated to undocumented "features" is in handling batch file variables. 4DOS allows 128 batch variables (%0 to %127), and COMMAND.COM only 10 (0 to %9).

Registration

The registration fee for a single copy of 4DOS is $50. Payment of this fee entitles you to:

- A disk with the latest version of 4DOS, registered to you.
- One copy of the printed and bound 4DOS manual.
- An upgrade to the next major release of 4DOS.
- Technical support via electronic mail or telephone.
- A subscription to the 4DOS newsletter.

If you prefer, you can register for $35 and receive only the disk and notices of future upgrades. Contact:

J. P. Software
P. O. Box 1470
E. Arlington, MA 02174
(617) 646-3975

Newkey (Disk 181)

Special requirements None

Newkey is a keyboard enhancer that simplifies the entry of common keystroke sequences by allowing these sequences to be assigned to any key desired. Once assigned to a particular key, whenever that key is struck, the predefined sequence of keystrokes will be returned in place of the struck key. For example, the Alt–C key combination might be defined as "copy" and whenever Alt–C is struck the string "copy" will be returned.

Newkey lets you customize your application software packages and lets you readily create boiler plate passages. It also provides help menus, keyboard redefinition, cursor speed up, a screen blanker, an extended keyboard buffer, and other useful features.

Several programs make up the Newkey software package. These programs are:

NEWKEY.EXE	Actually replaces IBM's keyboard interrupts (×'9' and ×'16'). This program remains resident while other programs execute and unless called upon to translate will be transparent.
NEWKEYSM.EXE	The small version of NEWKEY.EXE. It is identical to the regular version, except that it lacks the pop-up features and takes about 25K less memory.
NEWKEYSP.EXE	Provides several functions necessary to effectively use Newkey.
NEWKEYVS.EXE	The very small version of NEWKEY.EXE. It is identical to the regular version, except that it lacks the pop-up features and several other features. It takes substantially less memory.

Some Newkey features are listed here for your consideration. Several of these are explained in more detail below.

- Ability to redefine almost any key
- Menu macros
- Display macros
- Fixed-length pauses during key translation
- Nested key translation
- Translation bypass for native entry of defined key
- Dynamic display of the macro directory
- Dynamic display of macros
- Full-featured macro editor
  - ~Easily change any macro
  - ~Copy/move one macro to another
  - ~Move keyboard buffer into macro
- Load, merge, and save macro files from within other applications
- Shorthand mode: Newkey watches your keystrokes and, when they match a macro name, automatically plays back the macro. There is no special hotkey to enter, no wasted keystrokes.
- Date/time macro function: define your own date and time templates and let Newkey fill them in for you
- Fast-key option allows fast cursor movement and key repetition
- Use Newkey's pop-up features in graphics mode
- Compatible with IBM's new "enhanced keyboard"
- Guard macros from accidental deletion
- Deactivate macros
- Save/load file overwrite warning messages
- Disk wait during macro playback
- Screen on/off macro function
- Enhanced compatibility with other programs
- Suppress Newkey created keycodes that collide with other programs
- Keyboard click
- Beep during macro definition
- Cursor change during macro definition/playback made optional
- Customize Newkey's menu colors
- Screen blanker works with EGA
- Dynamic modification of the control keys
- Dynamic clear macros from memory

- User-defined dynamic define area length
- Time delay pauses during key translation
- Toggle Newkey on/off
- Slow typing mode
- Cancel Newkey processing at any time during playback or definition
- Macro can call itself
- Screen saver feature to blank screen after period of inactivity
- Ability to define a macro within a macro
- Multicharacter macro names
- Improved screen saver that works with most hardware and software
- Macro descriptions
- 128-keystroke typeahead buffer
- Speed up keyboard repetition rate
- Improved macro definition facilities, including
  - ~Defining status line
  - ~Macro-already-defined warning message
  - ~Defining-alphabetic-character warning message
  - ~Display/execute macro commands from menus as well as from control keys
  - ~Macro definition window
- Call Newkey from its own macros
- Cut and paste
- Support for DOS 2.0 pathnames

NEWKEYSP.EXE, the Newkey support program, provides many functions including:

- Saving macros to disk from memory
- Loading macros from disk to memory and merging macros from disk to memory
- Directory display of keys with translations
- Individual display of key translations
- Easy modification of Newkey control keys
- Clear macros from memory
- Toggle Newkey on/off
- Execute macros from a batch file
- Unload and reclaim memory under DOS 2.0
- Be called from Newkey macros
- Display macros and their descriptions

Loading Newkey

To load Newkey into memory, type

```
NEWKEY [/#####] [/f]
```

where:

/#####	##### specifies the buffer size set up in memory
/f	Forces Newkey to load into memory

Within a second or two a short message will be displayed with the line

```
Newkey loaded
```

at the bottom. When you see this message, Newkey is loaded and ready to use. Newkey gives you the option to load a predefined set of macros.

Newkey command line details

Newkey comes with a default macro buffer size that will accept up to 1000 characters of macro definitions. This default can be changed at run time by specifying the parameter /##### when first invoking Newkey where ##### is up to a 5-digit number specifying the number of characters to be reserved for the macro buffer. Newkey will reserve twice this number of bytes in memory (each character requires two bytes). For example:

```
NEWKEY /1000
```

will reserve enough space for 1000 characters of playback (2000 bytes of storage). The legal range for this number is 5 to 32,000.

Occasionally, Newkey will think that it is already loaded when in fact it is not. In order to force Newkey to load, add the parameter /f when initially loading Newkey. For example:

```
NEWKEY /f
NEWKEY /1000 /f
```

will force Newkey to load even if it thinks it is already loaded.

The most likely time this parameter will be necessary is when you are using a warm boot program that preserves certain areas of the computer's memory. Be careful; if Newkey is accidentally loaded a second time, the results will be unpredictable.

Pop-up access to Newkey's features

Most of Newkey's features can be invoked at any time without leaving your current application program by pressing the pop-up key, Alt-/. Newkey will save your current screen, present you with a menu of options, and when you are done, restore your screen just where you left off. This feature

is not available in the small version of Newkey, NEWKEYSM.EXE, resulting in a savings of 25K in memory.

Creating macros

The Newkey keyboard enhancer simplifies the entry of common keystroke sequences by allowing these sequences to be assigned to any key desired. Once assigned to a particular key, whenever that key is struck, the predefined sequence of keystrokes will be substituted for the struck key.

For example, the Alt – C key combination might be defined as "copy." Whenever Alt – C is struck, the string "copy" will be substituted for it. The process of assigning a sequence of keystrokes to another key is called "macro definition." The process of substituting the Newkey-assigned sequence for a key that is actually struck is called "playback."

To define a macro follow these steps:

1. Press the Alt – = key combination. A window will open up on the screen.

2. Press the key you wish to define. Let's assume that you are defining Alt – C to be "copy." Press Alt – C, and it will be displayed in the window.

3. Now you will be asked to enter a description. This optional field allows you to create a short description of what the macro does. In the example below, "Start copying" is the description that has been entered.

   When you are finished entering the description press Enter. At this point, the following four things will happen:
   - The window will close
   - A status line will be displayed at the top of your screen
   - The cursor will take on a block shape
   - A beep will sound each time you press a key

   As long as you are in macro definition mode, the status line will be displayed, the cursor will retain some sort of block shape, and each keystroke will cause a beep.

4. Enter the keystrokes you want the macro to represent ("copy" in our example). Your software will continue to act on these keystrokes as if macro definition was not occurring. Newkey is just listening in as you type and remembering your keystrokes. The software you are using (whether you are at the DOS command line, in your word processor, or using a spreadsheet) does not realize that Newkey is there. This feature enables you to monitor the macro definition to ensure that you are actually creating a macro that will do what you wish. As you type, your software is reacting to your keystrokes just as it will later when you play the macro back.

5. When you have finished defining the macro, press the Alt-key combination. The status line will disappear, the cursor will take on its normal shape, and your macro definition is finished.

Now, press Alt-C and watch "copy" be played back. Unless it is saved in a disk file, the new macro will be lost when the system is rebooted. The "Save File" menu option will save the macro to a disk file. Later, the macro can be recalled with the "Load File" menu option.

Menu access to macro-definition commands This option allows you to have another method of executing macro commands besides pressing the appropriate control key. If you don't remember what key does what, call up the pop-up menu and select the "Execute macro commands" option.

A menu will be displayed listing all of your possible options. Only those that are highlighted can be selected. Those that are highlighted will depend on several factors, such as whether you are in macro definition mode or not.

Other ways to edit macros Macros also can be created or modified by using Newkey's macro editor (on macros in memory) or with your word processor or text editor (on a saved macro file). To use Newkey's macro editor, press Ctrl-\. This keystroke will take you into the Newkey macro editor for the key being defined. You also can edit the macro by entering the macro editor in the normal manner through the pop-up key.

Macro controls Newkey offers many methods for controlling how and when macros will be executed. You can unload Newkey permanently or just turn it off for the next keystroke. You can slow macro playback to a crawl or let it zip along.

The macro-definition status line Newkey will display a status line during macro definition. This status line will display in reverse video the key being defined, the current defining mode, and which keys to press to end or cancel the macro definition. Possible defining modes are:

TEXT	Text mode
FIX	Fixed-length pause
VAR	Variable-length pause

The status line will not be displayed if your program is currently in graphics mode.

Sample macros Several sample macro files are supplied with Newkey to illustrate its use and provide you with a starting point. These macro files are selfdocumenting. You might find it useful to print the documentation before using the macro files.

How macros work

When you load Newkey, it makes itself part of the software controlling your

computer. From that time forward, it is continually "listening in" to the conversation you are having with your computer as you type at the keyboard. It listens when you are at the DOS command line. It listens when you are working in your word-processor, your spreadsheet, or whatever program you are running at the time.

As it listens, Newkey checks each keystroke against Newkey's list of macros. When a keystroke with a macro assigned to it is recognized, Newkey jumps in and plays the macro back. It fools the computer's software into thinking that it is reading from the keyboard. When the macro is done, Newkey returns everything to normal and lets your computer's software start reading from the keyboard once again.

Keyboard and screen features

In addition to its macro capabilities, Newkey offers many other keyboard and screen related features, some of which are described below.

Screen saver mode The screen saver feature will blank your screen after five minutes of inactivity. The screen will be restored whenever you press a key or your program writes to the screen. This feature protects your video terminal from burn-in caused by prolonged display of the same text. You do not have to worry about turning down your video when you leave your PC.

The screen saver can be turned off by changing the "Blank screen" option. This option and all of the other screen saver options described below can be changed by selecting the "Parameters" option from the pop-up menu.

If you have trouble restoring the screen, try pressing the Alt, Ctrl, left Shift, or right Shift keys.

The screen saver comes set up to wait five minutes before blanking the screen, but you can change the delay to be any time between 1 and 99 minutes by changing the "Blank screen delay" option.

Extended keyboard buffer Newkey's extended keyboard buffer increases the size of DOS's typeahead buffer from 16 to 128 keystrokes. Although it has been designed for maximum compatibility, it's possible that the buffer might cause problems when run with other software, especially other memory-resident programs. If you are having trouble using Newkey, try turning the "Extended Buffer" option off, causing Newkey to use DOS's normal buffer. This option can be found by selecting the "Parameters" on the pop-up menu.

Fast-key parameters Newkey will allow you to dramatically increase the speed that your keyboard will repeat a key that is held down. You can set both the delay before repetition will begin and the rate at which repetition will occur.

To activate this feature, select the "Fast key" option on the "Parameters" menu and set the rate and delay parameters described below. The

best way to choose settings for these options is to try various combinations out.

Newkey helps you control this option by monitoring the state of your keyboard buffer and refusing to insert any additional keys if your program has not already dealt with the previous ones. This monitoring helps to prevent overrun that might otherwise occur as your keyboard buffer fills up with keystrokes that your program cannot process. When you release a key, your program will not receive any more unwanted keystrokes.

The method Newkey uses to prevent overrun does not work with all programs. If you find that key repetition is actually slower, try the "Alternate fast key mode."

Cap/Num Lock indicators Newkey will display the status of your Caps and Num Lock keys in the top right corner of your screen. To turn this feature off, select the "Cap/Num Lock Indicators" option on the "Parameters" menu.

Caps/Ctrl key switch on enhanced keyboards To accommodate the many requests we have received to switch the Caps and Ctrl keys on the enhanced keyboard, a "Switch Caps/Ctrl" option has been added. To invoke this option, select the "Switch Caps/Ctrl" option on the "Parameters" screen.

Registration

To register as an official Newkey user, send $43 to

FAB Software
P.O. Box 336
Wayland, MA 01778
(508) 358-6357

As a registered user you will receive:

- The latest version of Newkey
- A printed manual
- Telephone and written support
- Notification of new versions

Reconfig (Disk 1218)

Special requirements IBM-compatible microcomputer with 384K memory, DOS 2.0 or later, and a hard disk.

Every time you turn your PC on or reboot it, DOS reads and executes the two files that define the configuration of your system: CONFIG.SYS and AUTOEXEC.BAT. Chances are, if you've been using DOS for a while, you're already familiar with these files. CONFIG.SYS sets the number of files, sets the DOS shell, loads device drivers, and performs other odds and

ends. AUTOEXEC.BAT is simply a batch file that runs automatically at booting time. Major uses for AUTOEXEC.BAT are setting the DOS path, loading TSRs, and running a first application, often a menu program. Many times, different applications require different configurations. Some applications require differing numbers of open files and buffers. Certain applications sometimes require specific device drivers. Changing the configuration is not really a very easy process, especially if you need to do it often. Reconfig, however, makes reconfiguring your system a breeze.

What is a configuration?

The AUTOEXEC.BAT file and the CONFIG.SYS file define your system's configuration. Reconfig allows you to have more than one configuration. Reconfig quickly reconfigures your system by copying a predefined configuration to your AUTOEXEC.BAT and CONFIG.SYS files. For example, RECONFIG NORMAL copies the NORMAL configuration from Reconfig's database to C:\AUTOEXEC.BAT and C:\CONFIG.SYS, then automatically reboots the machine. Rebooting is necessary so the system will rerun the new CONFIG.SYS and AUTOEXEC.BAT files.

Installing Reconfig

To install Reconfig, you must use the INSTALL.BAT file on the distribution disk. Do not just copy the files from the floppy to a directory on your hard disk, or else you will not get the RECONFIG.BAT file that is used to start up the program. Insert the Installation Disk into a floppy drive and then type:

A: or B: if you inserted the diskette into Drive B
`INSTALL [directory]`

INSTALL creates a batch file called RECONFIG.BAT, which should always be used to run the Reconfig program. RECONFIG.BAT is placed in the root directory of drive C. The batch file can be moved to any directory that is in your path.

If you do not specify a directory to INSTALL, Reconfig will be installed to the C:\RECONFIG directory. If you prefer to install Reconfig to a different directory, include the name of the directory after the word INSTALL. For example, INSTALL D:\TOOLS\RECONFIG will install Reconfig to the \TOOLS\RECONFIG directory on drive D. However, the RECONFIG.BAT file is still copied to the root directory of drive C. Remember, you can move RECONFIG.BAT to any directory on your hard disk as long as the directory is in your path.

During installation, your original AUTOEXEC.BAT and CONFIG.SYS files are copied to the Reconfig installation directory. The duplication of those files is done as a safety precaution only.

Running Reconfig

Reconfig can be run by typing the following command at the DOS prompt:

```
RECONFIG [name] [NOBOOT]
```

where the parameters are

name	Name given to a previously saved configuration. If included, that configuration will be loaded and the system will reboot
NOBOOT	Allows a configuration to be loaded, but does not reboot.

To enter Reconfig's configuration editing environment, simply type RECONFIG with no parameters.

Type RECONFIG [*configname*] to automatically reconfigure your system to a predefined configuration. For example, RECONFIG NORMAL changes your AUTOEXEC.BAT and CONFIG.SYS files to your normal configuration, and then automatically reboots your machine. As a safety precaution, your previous configuration is kept in the AUTOEXEC.BAK and CONFIG.BAK files located in the Reconfig installation directory.

Type RECONFIG NORMAL NOBOOT to change your system to its NORMAL configuration without rebooting after the change.

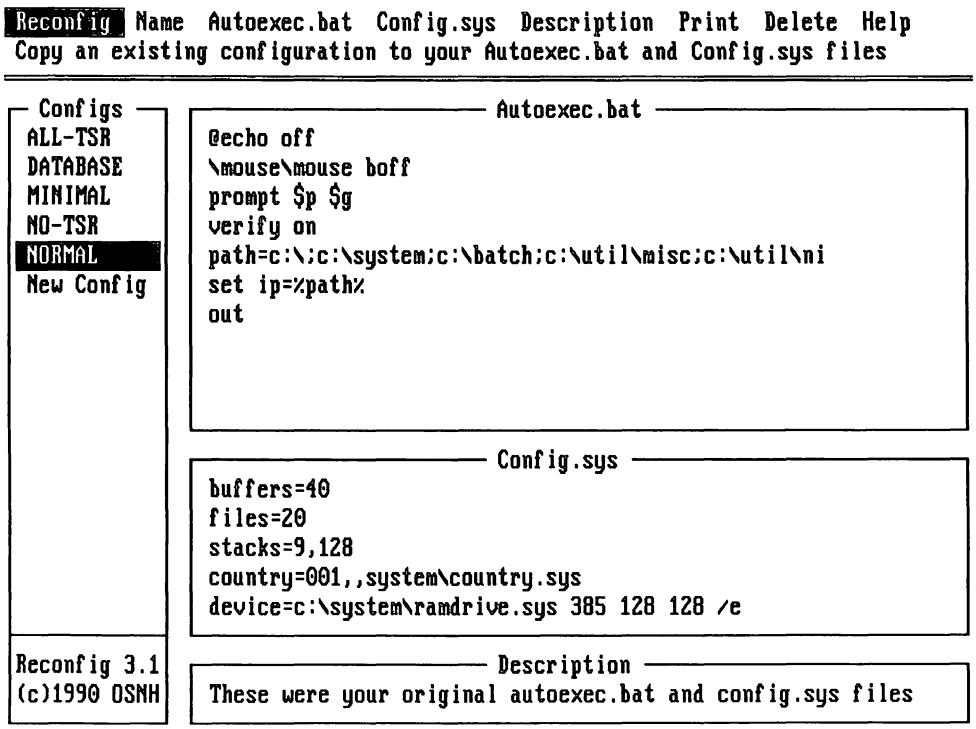
The configuration editor

Type RECONFIG at the DOS prompt to enter Reconfig's configuration-editing environment. Figure 4-3 shows the configuration editor's screen. The commands are along the top of the screen, and the names of the existing configurations are along the left side of the screen. Use the left and right arrow keys to highlight a command. Use the up and down arrow keys to highlight a configuration. Then, press the Enter key to simultaneously select the highlighted command and configuration. The central part of the screen displays the AUTOEXEC.BAT and CONFIG.SYS files that are associated with the configuration that is currently highlighted. Each configuration also has an associated description line.

To leave Reconfig, press the Esc key. Reconfig will return you to the root directory.

Getting started

During the installation process, Reconfig imports your current AUTOEXEC.BAT and CONFIG.SYS files into the configuration called NORMAL. Reconfig also creates a simple but useful configuration called MINIMAL. The MINIMAL configuration is useful when you want an environment with no memory-resident programs in your AUTOEXEC.BAT and no device drivers in your CONFIG.SYS.



4-3 Reconfig's menu-driven editing environment.

Note that if your system requires a device driver in order for it to see your hard disk or floppy disk, it would be a good idea to include the device driver in your MINIMAL configuration. It also is a good idea to include a path statement (at least a path to your DOS directory) in the MINIMAL configuration.

Creating a new configuration

The last configuration is always called "New Config." To create a new configuration, highlight "New Config" and the Name, AUTOEXEC.BAT, CONFIG.SYS, or Description commands, then press Enter. The contents of the new configuration will be identical to the last configuration edited.

Command descriptions

When each command is highlighted, a single line of help appears just below the main command line.

Using the Reconfig command The Reconfig command copies the highlighted configuration's AUTOEXEC.BAT and CONFIG.SYS files to the C:

\AUTOEXEC.BAT and C:\CONFIG.SYS files. You then are asked to type Y if you would like to reboot the machine immediately. Note that if the highlighted configuration is "New Config," then this command has no effect.

Using the Name command The Name command allows you to change the name of the highlighted configuration. Be warned that after you change the name and press Enter, the configurations will be resorted. You can use the Name command to create a new configuration. See "Creating a new configuration" above.

Using the AUTOEXEC.BAT command The AUTOEXEC.BAT command allows you to change the AUTOEXEC.BAT file associated with the highlighted configuration. When you select the AUTOEXEC.BAT command, you are placed in a full-screen editor. F2 will save the changes you make, and Esc will abandon the changes made. You can use the AUTOEXEC.BAT command to create a new configuration. See "Creating a new configuration" above.

Using the CONFIG.SYS command The CONFIG.SYS command allows you to change the CONFIG.SYS file associated with the highlighted configuration. When you select the CONFIG.SYS command, you are placed in a full-screen editor. F2 will save the changes you make, and Esc will abandon the changes made. You can use the CONFIG.SYS command to create a new configuration. See "Creating a new configuration" above.

Using the Description command The Description command allows you to change the description associated with the highlighted configuration. The description can be useful to help explain the purpose of a configuration. You can use the Description command to create a new configuration. See "Creating a new configuration" above.

Using the Print command The Print command allows you to print out all of the configurations. When you select the Print command, Reconfig will ask you for a filename to output to. If you want to print to a printer rather than to a file, enter PRN: as the filename. Note that it does not matter which configuration is highlighted when you select this command, because all configurations are printed.

Using the Delete command The Delete command allows you to delete the highlighted configuration. After you select the Delete command, you will be asked to confirm your deletion request by pressing Y. Any other key will abandon the deletion operation. Note that you cannot delete the configuration called "New Config."

Using the Help command The Help command gives some simple online help to get you started. Note that is does not matter which configuration is highlighted when you select this command.

Importing text files into Reconfig

There are three command line parameters that can be used to transfer text files automatically to AUTOEXEC.BAT and CONFIG.SYS. These parameters are especially useful when using Reconfig in a batch file. (The use of these parameters is shown below.)

RECONFIG -I *configname autoexecfile configsysfile*

will import both AUTOEXEC.BAT and CONFIG.SYS

RECONFIG -IA *configname autoexecfile*

will import AUTOEXEC.BAT only

RECONFIG -IC *configname configsysfile*

will import CONFIG.SYS only

where *configname* is the exact name of a configuration, *autoexecfile* is the fully-specified filename of an AUTOEXEC.BAT file, and *configsysfile* is the fully-specified filename of a CONFIG.SYS file.

Examples:

```
RECONFIG -I WINDOWS C:\AUTOEXEC.WIN C:\CONFIG.WIN
RECONFIG -IA NORMAL C:\AUTOEXEC.OLD
RECONFIG -IC NORMAL C:\CONFIG.SYS
```

Note that if a configname does not exist, a new configuration will automatically be created. Also, if a specified text file does not exist, the import operation will be aborted.

Registration

To register your copy of Reconfig, send $39.50 to

Optimal Solutions of NH
6 Salem Road
Atkinson, NH 03811

Upon registration, you will receive

- Latest version of RECONFIG
- Latest version of the documentation
- Automatic upgrade to RECONFIG 4.0 (when available)

5
Catastrophic insurance

The more we depend on our computer data, the more frightening the possibility of data corruption becomes. One of the greatest threats to PC owners is that of computer viruses. Your chances of being victimized by a virus actually are quite low. The consequences of a virus attack, however, can be devastating. It's worth doing everything you can to protect your data. Despite its undeserved reputation, shareware is remarkably virus free, which is due in part to the diligence of bulletin board services and shareware distributors like PC-SIG in ensuring that viruses never infect any of the shareware they distribute. It is also due to shareware products like VIRUSCAN. VIRUSCAN is a set of utilities that will search your disks, looking for any of 213 different viruses. If a virus is found, you can destroy it. In many cases, you can repair any damage the virus has caused.

Another danger to PC owners, one that we don't often think about, is battery failure. Most PCs have a small amount of RAM, called CMOS RAM, that contains information about the configuration of the system hardware (type of disk drive, graphics display, etc.). When your PC is turned off, the information in the CMOS RAM is preserved by a set of batteries. Usually, these batteries are rechargeable and can last for many years; however, they all eventually go dead. When they do, the setup information in the CMOS RAM is lost. Restoring all of the proper information can be a difficult chore. A program called CMOS_RAM can make things a lot easier on you. CMOS_RAM stores the setup information permanently in a disk file. When your batteries fail, you can simply replace your batteries, and then replace the setup information using CMOS_RAM.

VIRUSCAN (Disk 2095)

Special requirements none

The subject of computer viruses has been in the news from time to time, usually when some large computer system somewhere comes crashing down and millions of dollars are lost due to the childish antics of a misguided, would-be computer genius. Viruses are classic examples of the tragic misuse of creative talent toward an end of vicious, pointless destruction. Some viruses are essentially harmless, spreading themselves throughout computer systems, doing little more than robbing some disk space and execution time. Some simply are annoying. Others, however, can be destructive to data and system operations. Considering that people's lives, quite literally, depend on the faultless operation of many computer systems (for example, medical life support and air traffic control systems), creating viruses is nothing less than criminal activity.

The analogy between biological viruses and computer viruses is quite accurate. Computer viruses attach themselves to programs, overlays, and other executable code, diverting normal execution, and taking control themselves. They spread themselves from file to file, system to system. If a virus goes undetected, it could strike at any time. Some lie dormant for a while, waiting for a certain period of time, a certain number of executions or a certain date (usually something like Friday 13 or April 1). Fortunately, once discovered, methods can be devised to detect viruses and eradicate them. Detecting and removing viruses is the work of the Computer Virus Industry Association. Their work is difficult and never ending. Every day, the virus inventors continue to pervert their talents, creating new, more insidious strains.

Although you might not have noticed any effects from computer viruses, there could be some lurking in your PC. The purpose of the VIRUSCAN utilities is to detect known viruses, destroy them, and keep them from coming back.

TABLE 5-1 outlines the major characteristics of the known IBM PC and compatible virus strains identified by SCAN. The number of known varieties of a virus is listed in parentheses beside the name. The current total number of known viruses is 213.

How to protect yourself

The following sections of this chapter describe the three VIRUSCAN utilities, plus a fourth utility that can be used to doublecheck individual files. The basic approach to virus protection involves using SCAN to check your system for known viruses. VSHIELD, a memory-resident utility, can be loaded into memory to continuously guard against infection. If a virus is ever discovered, CLEAN can be used to remove it. In addition, VALIDATE can be used to check

Table 5-1 List of Virus Characteristics*

Virus	Program used to disinfect	Increase in infected program's size	Damage
Anthrax - Boot [Atx]	M-Disk	N/A	O,P,D
Anthrax - File [Atx]	Clean-Up	1206	O,P,D
651 [651]	Clean-Up	651	O,P,D
TCC [TCC]	Clean-Up	4909	O,P,D,L
Leprosy	Clean-Up	Overwrites	
Mardi Bros. [Mardi]	M-DISK	N/A	B,O
1253 - Boot [1253]	M-DISK	N/A	O,P,D,L
1253 - COM [1253]	Clean-Up	1253	O,P,D,L
AirCop [AirCop]	M-DISK	N/A	B,O
400 (5) [400]	Clean-Up	Vary	O,P,D
P1 (3) [P1r]	Clean-Up	Vary	O,P,D,L
Ontario [Ont]	Clean-Up	Vary	O,P,D
1226 (3) [1226]	Clean-Up	1226	O,P,D
V2100 [2100]	Clean-Up	2100	O,P,D,L
Plastique (3) [P1q]	Clean-Up	3012	O,P,D
Wolfman [Wolf]	Clean-Up	2064	O,P
Doom2 [Dm2]	Clean-Up	2504	O,P,D,L
Flip [Flip]	Clean-Up	2343	O,P,D,L
Fellowship [Fellow]	Clean-Up	1022	O,P,D,L
Flash [Flash]	Clean-Up	688	O,P,D,L
1008 [1008]	Clean-Up	1008	O,P,D,L
Stoned-II [Stoned]	M-DISK	N/A	O,B,L
Taiwan3 [T3]	Clean-Up	2905	O,P,D,L
Armagedon [Arma]	Clean-Up	1079	O,P
1381 [1381]	Clean-Up	1381	O,P
Tiny (7) [Tiny]	Clean-Up	163	O,P
Subliminal [Sub]	Clean-Up	1496	O,P
Sorry [Sorry]	Clean-Up	731	O,P
RedX [Redx]	Clean-Up	796	O,P
1024 [1024]	Clean-Up	1024	O,P
Joshi [Joshi]	M-DISK	N/A	B,O,D
Microbes [Micro]	M-DISK	N/A	B,O,D
Print Screen [Prtscr]	M-DISK	N/A	B,O,D
Form [Form]	M-DISK	N/A	B,O,D
July 13th [J13]	Clean-Up	1201	O,P,D,L
5120 (2) [5120]	Clean-Up	5120	O,P,D,L
Victor [Victor]	Clean-Up	2458	P,D,L

*The number of known varieties is listed in parenthesis beside the name of the strain. The Clean-Up virus I.D. code is shown in brackets. This code facilitates the use of SCAN shells and on-line virus help programs such as Virus Rescue.

Table 5-1 Continued

Virus	Program used to disinfect	Increase in infected program's size	Damage
JoJo [JoJo]	Clean-Up	1701	O,P
W-13 (2) [W13]	Clean-Up	532	O,P
Slow [Slow]	Clean-Up	1721	O,P,L
Frere Jacques [Frere]	Clean-Up	1811	O,P
Liberty [Liberty]	Clean-Up	2862	O,P
Fish-6 [Fish]	Clean-Up	3584	O,P,L
Shake [Shake]	Clean-Up	476	O,P
Murphy [Murphy]	Clean-Up	1277	O,P
V800 [V800]	Clean-Up	none	O,P,L
Kennedy [Kennedy]	Clean-Up	308	O,P
8 Tunes/1971 [1971]	Clean-Up	1971	O,P
Yankee - 2 [Doodle2]	Clean-Up	1961	O,P
June 16th [June16]	Clean-Up	1726	F,O,P,L
XA1 [XA1]	Clean-Up	1539	F,O,P,L
1392 [1392]	Clean-Up	1392	O,P,L
1210 [1210]	Clean-Up	1210	O,P,L
1720 [1720]	Clean-Up	1720	F,O,P,L
Saturday 14th [Sat14]	Clean-Up	685	F,O,P,L
Korea (2) [Korea]	M-DISK	N/A	B,O
Vcomm (3) [Vcomm]	Clean-Up	1074	O,P,L
ItaVir [Ita]	Clean-Up	3880	O,P,L,B
Solano (2) [Solano]	Clean-Up	2000	O,P,L
V2000 (3) [2000]	Clean-Up	2000	O,P,L
1559 [1559]	SCAN/D	1554	O,P,L
512 (4) [512]	SCAN/D	none	O,P,L
EDV (2) [EDV]	M-DISK	N/A	B,O
Joker [Joke]	Clean-Up		O,P
Icelandic-3 [Ice-3]	Clean-Up	853	O,P
Virus-101 [101]	Clean-Up	2560	P
1260 [1260]	Clean-Up	1260	P
Perfume (2) [Fume]	Clean-Up	765	P
Taiwan (2) [Taiwan]	Clean-Up	708	P
Chaos [Chaos]	MDISK	N/A	B,O,D,F
Virus-90 [90]	Clean-Up	857	P
Oropax (3) [Oro]	Clean-Up	2773	P,O
4096 (2) [4096]	Clean-Up	4096	D,O,P,L
Devil's Dance [Dance]	Clean-Up	941	D,O,P,L
Amstrad (5) [Amst]	Clean-Up	847	P
Payday [Payday]	Clean-Up	1808	P
Datacrime II-B [Crime-2]	Clean-Up	1917	P,F

*The number of known varieties is listed in parenthesis beside the name of the strain. The Clean-Up virus I.D. code is shown in brackets. This code facilitates the use of SCAN shells and on-line virus help programs such as Virus Rescue.

Table 5-1 Continued

Virus	Program used to disinfect	Increase in infected program's size	Damage
Sylvia/Holland [Holland]	Clean-Up	1332	P
Do-Nothing [Nothing]	Clean-Up	608	P
Sunday (2) [Sunday]	Clean-Up	1636	O,P
Lisbon (2) [Lisb]	Clean-Up	648	P
Typo/Fumble [Typo]	Clean-Up	867	O,P
Dbase [Dbase]	Clean-Up	1864	D,O,P
Ghost Boot [Ghost]	MDISK	N/A	B,O
Ghost COM [Ghost]	Clean-Up	2351	B,P
New Jerusalem [Jeru]	Clean-Up	1808	O,P
Alabama (2) [Alabama]	Clean-Up	1560	O,P,L
Yank Doodle (3) [Doodle]	Clean-Up	2885	O,P
2930 [2930]	Clean-Up	2930	P
Ashar [Brain]	Clean-Up	N/A	B
AIDS (3) [Aids]	Clean-Up	Overwrites	
Disk Killer (2) [Killer]	Clean-Up	N/A	B,O,P,D,F
1536/Zero Bug [Zero]	Clean-Up	1536	O,P
MIX1 [Ice]	Clean-Up	1618	O,P
Dark Avenger (2) [Dav]	Clean-Up	1800	O,P,L
3551/Syslock [Syslock]	Clean-Up	3551	P,D
VACSINA (2) [Vacs]	Clean-Up	1206	O,P
Ohio [Ohio]	MDISK	N/A	B
Typo Boot [Typo]	MDISK	N/A	O,B
Swap Boot [Swap]	MDISK	N/A	B
Datacrime II [Crime-2]	Clean-Up	1514	P,F
Icelandic II [Ice-2]	Clean-Up	661	O,P
Pentagon [Pentagon]	MDISK	N/A	B
Traceback (2) [3066]	M-3066	3066	P
Datacrime-B [Crime-B]	Clean-Up	1168	P,F
Icelandic (2) [Ice]	Clean-Up	642	O,P
Saratoga [Ice]	Clean-Up	632	O,P
405 [405]	Clean-Up	Overwrites	
1704 Format [170x]	Clean-Up	1704	O,P,F
Fu Manchu (2) [Fu]	Clean-Up	2086	O,P
Datacrime (2) [Crime]	Clean-Up	1280	P,F
1701/Cascade [170x]	Clean-Up	1701	O,P
CASCADE-B (9) [170x]	Clean-Up	1704	O,P
Stoned (2) [Stoned]	Clean-Up	N/A	O,B,L
1704/CASCADE [170x]	Clean-Up	1704	O,P
Ping Pong-B (2) [Ping]	Clean-Up	N/A	O,B
Den Zuk (3) [Zuk]	MDISK	N/A	O,B

*The number of known varieties is listed in parenthesis beside the name of the strain. The Clean-Up virus I.D. code is shown in brackets. This code facilitates the use of SCAN shells and on-line virus help programs such as Virus Rescue.

Table 5-1 Continued

Virus	Program used to disinfect	Increase in infected program's size	Damage
Ping Pong (3) [Ping]	Clean-Up	N/A	O,B
Vienna-B [Vienna]	Clean-Up	648	P
Lehigh [Lehigh]	Clean-Up	Overwrites	P,F
Vienna/648 (14) [Vienna]	M-VIENNA	648	P
Jerusalem-B [Jeru]	Clean-Up	1808	O,P
Alameda (2) [Alameda]	Clean-Up	N/A	B
Friday 13th COM [Fri13]	Clean-Up	512	P
Jerusalem (9) [Jeru]	Clean-Up	1808	O,P
SURIV03 [SurivB]	Clean-Up		O,P
SURIV02 [SurivB]	Clean-Up	1488	O,P
SURIV01 [SurivA]	Clean-Up	897	O,P
Brain (3) [Brain]	Clean-Up	N/A	B

Damage Fields B – Corrupts or overwrites Boot Sector
O – Affects system run-time operation
P – Corrupts program or overlay files
D – Corrupts data files
F – Formats or erases all/part of disk
L – Directly or indirectly corrupts file linkage

Size Increase The length, in bytes, by which an infected program or overlay file will increase

Note: M-DISK is another shareware product not normally distributed with VIRUSCAN.

Disinfectors SCAN/D—VIRUSCAN with /D option
SCAN/D/A—VIRUSCAN with /D and /A options
MDISK/P—MDISK with "P" option
All others—The name of disinfecting program

Note: the SCAN /D option will overwrite and then delete the entire infected program. The program must then be replaced from the original program diskette. If you wish to try and recover an infected program, then use the named disinfector if available.

*The number of known varieties is listed in parenthesis beside the name of the strain. The Clean-Up virus I.D. code is shown in brackets. This code facilitates the use of SCAN shells and on-line virus help programs such as Virus Rescue.

files for the possible existence of viruses that have yet to be identified. Below are some brief descriptions of the VIRUSCAN utilities.

SCAN looks for any preexisting PC virus infection. More than 75 different virus strains and numerous subvarieties for each strain can be identified by this program. These viruses include the 10 most common viruses that account for more than 95% of all reported PC infections.

The memory-resident version of SCAN, VSHIELD, prevents viruses from getting into your system in the first place. VSHIELD monitors and

scans programs as they're loaded and prevents infected programs from executing. VSHIELD also scans specific areas of the system (the boot sector, partition table, hidden files, command interpreter and itself) when the utility is first executed. It's your first line of defense against virus attacks.

The last utility in VIRUSCAN's trilogy of defense, CLEAN, searches the entire system looking for the virus that you wish to remove. When found, the infected file is identified, the virus is isolated and removed, and for the more common viruses, the infected file is repaired. If the file is infected with a less common virus that can't be separated from the file, the infected file is wiped from the disk and deleted from the system.

An additional program, VALIDATE, searches through individual programs and produces validation codes for them. These codes can be checked against codes supplied by Computer Virus Industry Association and other reliable sources. Checking validation codes is a way to detect viruses that have not been discovered previously.

Virus removal

What do you do if a virus is found? If you are a registered VIRUSCAN user, you can contact McAfee Associates for free assistance in manually removing the virus or for information on disinfection utilities. Automatic disinfectors, like CLEAN, are available from McAfee Associates for the majority of the known viruses. You are strongly advised to get experienced help in dealing with many of the viruses, particularly partition table and boot sector infections.

In the absence of an automatic disinfection utility, you can, with great caution, follow the steps below.

Boot sector infections Power down the system. Power up and boot from an uninfected, write-protected floppy. Execute the DOS SYS command to attempt an overwrite of the boot sector. This procedure works in many cases. If it does not work, back up all data files and perform a low-level format of the disk.

Executable file infections Power down the system. Boot from a clean, write-protected floppy. Delete all infected files. Replace the files from the original distribution diskettes.

Partition table infections Without a removal utility, the only option is to do a low-level format on the disk.

Registration

The VIRUSCAN utilities are available from McAfee Associates. See the registration information for the individual utilities in the following sections. For more information, contact

McAfee Associates
4423 Cheeney Street
Santa Clara, CA 95054
(408) 988-3832
BBS: (408) 988-4004

Using SCAN to check for viruses

SCAN checks diskettes or entire systems and identifies any preexisting PC virus infection. It will indicate the specific files or system areas that are infected and will identify the virus strain that caused the infection. Removal can be done automatically using the SCAN /D option. If the infection is widespread, automatic disinfector utilities, such as CLEAN.EXE, are available that can remove the infected segment of files and repair and restore the infected programs.

SCAN can currently identify all 134 known virus strains and 213 virus substrains (varieties). The 213 viruses include the ten most common viruses, which account for over 95% of all reported PC infections. The complete list is shown in TABLE 5-1. The table lists and describes the 111 major strains and includes the number of known variants of each strain in parentheses.

All known viruses infect one of the following areas: the hard disk partition table, the DOS boot sector on hard disks or floppies, or one or more executable files within the system. The executable files can be operating system programs, system device drivers, .COM files, .EXE files, overlay files, or any other file that can be loaded into memory and executed. SCAN identifies every area or file that has become infected and indicates the name of the virus that has infected each file. SCAN can check the entire system, an individual diskette, a subdirectory, or an individual file for an existing virus.

How to use SCAN Always place SCAN on a write-protected floppy prior to using it to prevent the program from becoming infected.

To run SCAN type:

```
SCAN [drives] [options]
```

where the options are:

drives	Disk drive(s) to be scanned. Up to ten drives can be listed. Be sure to include the colon in the drive designation.
/NLZ	Do not scan inside compressed LZEXE files.
/D	Overwrite and Delete infected files.
/M	Scan memory for all viruses (see restrictions).
/A	Scan all files, not just executable files and overlays.
/E *list*	Scan listed overlay extensions. The list can include up to

three extensions. Be sure to include the period before each extension.

/NOMEM	Skip memory scan.
/MANY	Scan multiple floppies.
/AV	Add validation codes to specified files.
/RV	Remove validation codes from files.
/CV	Check validation codes.

Details SCAN will check each area or file on the designated drive that could be a host to a virus. If a virus is found, the name of the infected file or system area will be displayed, along with the name of the identified virus. When SCAN finds no viruses, it will display the screen shown in FIG. 5-1.

```
C:\>scan c:
SCAN 4.5B66 Copyright 1989-90 by McAfee Associates.  (408) 988-3832
Scanning for known viruses.

Disk C: contains 29 directories and 980 files.

 No viruses found.


SCAN 4.5B66 Copyright 1989-90 by McAfee Associates.  (408) 988-3832

    This program may not be used in a business, corporation, organization,
    government or agency environment without a negotiated site license.


C:\>
```

5-1 If SCAN finds no viruses, you will see this message.

SCAN will perform both an internal and an external scan on programs that are compressed with LZEXE. The compressed file will be scanned first externally, and then it will be automatically decompressed and scanned again for an internal infection. The /NLZ option will disable the decompression and internal scan function.

If the /D option is selected, SCAN will pause after each infected file is displayed and will ask whether you wish to remove the infected file. If you select Y, the file will be overwritten with the hex code C3 (the Return instruction), and then be deleted. This option is disallowed for boot sector and partition table infections. Use the shareware M-DISK utilities to remove boot sector or partition table viruses. M-DISK normally is not distributed with the other VIRUSCAN programs.

If the /M option is chosen, SCAN will search the first 640K of memory for all known memory-resident viruses. Selecting this option might cause

false alarms if you are running SCAN in conjunction with any other virus detection utility. It also will add from 12 seconds to 1 minute to the scanning time. If the /M option is not chosen, SCAN still will check memory for the Dark Avenger virus. If the Dark Avenger is found in memory, SCAN will display a warning message, with instructions to power down and reboot from a clean floppy.

Use the /E option to scan specified overlay files. Scan will default to OVL, OVG, OV1, OV2, OVR, SYS, BIN, and PIF. Scan will search these overlay files for any viruses capable of infecting overlays. If you are using an application with overlay extensions other than the defaults, then specify the extension names (up to three at a time) using the /E option. For example:

```
SCAN C: /E .ABC .XYZ .123
```

It is important to note that viruses infecting overlays always infect the original .COM, .EXE, .BIN, or .SYS files that call the overlay. Therefore, the virus will always be discovered whether or not the overlay is scanned. To get rid of the virus, however, you must identify it and remove it from overlays. If you do not know whether an application uses overlay files and SCAN has discovered one of the viruses capable of infecting overlays, then use the /A option to search all files.

Note: The /A option will require a substantial amount of time to complete the scan. Use it only after a .COM or .EXE infection has been discovered by SCAN or when a new diskette or set of program files is to be scanned.

SCAN will allow you to add validation codes to specified files or areas of the system. All .COM and .EXE files, as well as the boot sector and partition table, can be validated. The validation process adds 10 bytes to each validated file. For example, to validate your entire C disk type:

```
SCAN C: /AV
```

This command will cause SCAN to add the validation codes to all .COM and .EXE files. SCAN also will create a hidden file in the root of the designated drive that contains validation information for the partition table, the boot sector, and COMMAND.COM. The command:

```
SCAN C:\TEMP\NEWFILE.EXE /AV
```

will cause SCAN to add a validation code to the file, NEWFILE.EXE, in the \TEMP directory on drive C.

Note: SCAN will not create the file containing codes for the boot sector and partition table unless the entire disk is selected for validation.

To remove the validation codes from validated files, use the /RV option. To cause SCAN to check the validation codes, use the /CV option. The /AV, /RV, and /CV options can be used in conjunction with any other SCAN options.

SCAN will require approximately 3 minutes of run time for each 1,000 files on the designated drive. If the /CV option is selected, the run time will increase by 25%.

Warning: Some systems, notably older Zenith PCs and some Hewlett Packard models, use a nonstandard boot sector or partition table program. These programs might modify the boot sector or partition table each time the system is booted. If you are experiencing a warning flag from SCAN indicating continual changes in your boot sector or partition table, refer to your system's owner's guide to determine whether your system uses such a self-modifying boot program.

Exit codes SCAN will exit with the following exit codes:

0 Normal termination, no viruses found
1 One or more viruses found
2 Abnormal termination (Error)

Virus protection for networks SCAN works only on stand-alone PCs. If you are in a corporate environment using local area networks, you will need to run NETSCAN. NETSCAN is not a shareware product. Site licenses are available for NETSCAN through McAfee Associates.

Insuring SCAN's integrity SCAN contains a self-test at load time. If SCAN has been modified in any way, a warning will be displayed. The program will still continue to check for viruses, however. In addition, you can use the VALIDATE program to authenticate the integrity of SCAN.EXE. See the section on VALIDATE for instructions. The validation results for Version 66-B should be:

```
SIZE: 63,065
DATE: 8-13-1990
FILE AUTHENTICATION:
   Check Method 1 = 4C47
   Check Method 2 = 0AB0
```

You also can call the McAfee Associates bulletin board (see "Registration") to obtain online SCAN.EXE verification data. The VALIDATE program distributed with SCAN can be used to authenticate all future versions of SCAN.

Registration A registration fee of $25 is required for the use of SCAN. Send registrations to the address below. The registration cost covers the copy currently in use and any future versions for one year, provided they are obtained from the McAfee Associates bulletin board or other public or private board. Diskettes will not be mailed unless specifically requested. Add $9 for diskette mailings. The McAfee Associates board number is (408) 988-4004 (1200/2400, N,8,1; 5 lines).

McAfee Associates
4423 Cheeney Street
Santa Clara, CA 95054
(408) 988-3832

Guard against viruses with VSHIELD

VSHIELD is a memory-resident program that prevents viruses from getting into your system. It monitors and scans programs as they are loaded and prevents infected programs from executing. It also prevents boot viruses from entering the system by trapping each warm-boot request, Ctrl – Alt – Del, and disallowing reboots from infected diskettes. VSHIELD also scans specific areas of the system (the boot sector, partition table, hidden files, command interpreter and itself) when the program is first executed. Thus, if the power is turned off and the system is booted from an infected floppy (while VSHIELD is not running), VSHIELD will detect any infection the next time VSHIELD is loaded.

The memory-resident module, VSHIELD.EXE, will identify the virus strain that has caused the infection in all cases of the known viruses. VSHIELD remains active in your system at all times after it is loaded.

VSHIELD currently can identify and prevent infection from 133 major virus strains and 213 substrains. The 213 viruses include the ten most common viruses, which account for over 95% of all reported PC infections. The complete list is outlined in TABLE 5-1. VSHIELD identifies the area or file that has become infected and indicates the name of the virus that has infected each area. When an infection is identified, use SCAN to check the entire system and determine the extent of the infection.

Using VSHIELD Place VSHIELD on a write-protected floppy prior to installing it to ensure a valid copy in the event that the program becomes infected. To install VSHIELD, place the following line as the first entry in your AUTOEXEC.BAT file:

```
VSHIELD [options]
```

where the options are

`/SWAP[path]` Tells VSHIELD to install only its kernel as memory resident. The remaining functions will be swapped in and out of memory as needed, from the hard disk or from a RAM disk. The `SWAP` parameter also can use an optional pathname to specify where the swap file should be kept. The default is the VSHIELD.EXE home location. Use the `SWAP` parameter if your system has limited free-memory space available for memory-resident programs. With the `SWAP` parameter set, VSHIELD requires less than 3K of resident memory.

/F	Is a required parameter if the SWAP parameter is used on a system running DOS version 2 or earlier. The /F parameter tells VSHIELD where it has been loaded from.
/NB	Tells VSHIELD not to check the boot sector of floppies for viruses on a reboot. This option should only be used if the reboot check conflicts with other memory-resident programs.
/NOMEM	Tells VSHIELD not to perform a memory scan as it loads.

These examples illustrate the use of VSHIELD:

```
VSHIELD /SWAP
```

In this example, when VSHIELD is loaded, it will take up less than 3K of memory. Any additional functions it needs will be swapped from the disk.

```
VSHIELD /SWAP D:\TEMP
```

This command is the same as the previous example, except that the swapping will be done with the directory called \TEMP on drive D.

```
VSHIELD /SWAP /F C:\
```

For DOS 2 and earlier, this command will ensure that VSHIELD knows where it was loaded from.

```
VSHIELD /NB /NOMEM
```

In this example, VSHIELD will not check the boot sector of the floppy drive during rebooting, and it will not perform the memory scan when it loads.

Details Place VSHIELD.EXE in the root directory of your hard drive. VSHIELD then will become active each time the system is powered on or rebooted. It will check the critical areas of the system for viruses, including itself, and then monitor all programs when they load. As programs are loaded, VSHIELD will scan them looking for viruses. If a virus is found, VSHIELD will display a warning message and name the infection. The infected program then will be terminated. If a reboot is attempted while an infected diskette is in the bootable floppy drive, VSHIELD will disallow the

```
C:\>vshield
VSHIELD 2.0V66 Copyright 1989-90 by McAfee Associates.  (408) 988-3832
Scanning for known viruses.

VSHIELD 2.0V66 is now installed.

C:\>
```

5-2 VSHIELD first scans for viruses and then loads itself into memory.

boot attempt and will display a warning message. If VSHIELD detects no viruses when it is loaded, it will display the message shown in FIG. 5-2.

Unlike many such programs, VSHIELD will not cause false alarms. If a warning message is issued by VSHIELD, you can be assured the identified program or diskette is indeed infected. Also, because it does not attempt to monitor file I/O or normal disk accesses, it will not conflict with other memory-resident programs in most cases.

Memory-resident and network conflicts VSHIELD normally should be loaded as the first entry in the AUTOEXEC.BAT file. However, disk cache programs that allow cache writes as well as cache reads, such as PC Tools' PC-Cache, will not work, and can cause severe damage to the disk data, unless they are loaded before any other memory-resident programs. If you are running a disk cache routine that caches reads and writes to the disk, then place VSHIELD at the end of the AUTOEXEC.BAT file.

If you place VSHIELD at the end of the AUTOEXEC file, then the Write Delay parameters for the cache program must be set to zero. If the Write Delay for the cache program is set to any value other than zero, then data loss can occur if a reboot is attempted in the middle of a write to the disk. Refer to your cache program's user manual to determine how to set the Write Delay.

VSHIELD also must be placed at the end of the AUTOEXEC.BAT file if you are running in a local area network environment (IBM Token Ring, Novell, Banyan, or 3Com). VSHIELD must be placed last so it will provide the proper protection against viruses that might reside on the file server.

Note: If conflicts occur while using the `/SWAP` option of VSHIELD, then remove the option and reboot the system. Also, VSHIELD is not compatible with WINDOWS/386.

Error levels VSHIELD sets the DOS error level after it becomes resident. If it finds a virus in the boot sector, operating system, or itself prior to going resident, it sets the error level as shown:

No viruses found	0
One or more found	1
System error	2

Removing VSHIELD from memory VSHIELD can be removed from memory by issuing the following command:

```
VSHIELD /REMOVE
```

This command will remove the program from memory. If there are other memory-resident programs that have hooked the same interrupts as VSHIELD and have been loaded after VSHIELD, it might not be safe to remove the program. In that case, VSHIELD will not remove itself and will display an error message.

VSHIELD system overhead VSHIELD requires 3K of system memory when used in swap mode. It requires 25K if used in nonswap mode. It will add an average of 4 seconds to each program load and 6 seconds to each reboot. Swap mode will add an additional 600 milliseconds to each program load. After a program has loaded and begun execution, however, VSHIELD will not degrade the performance or speed of the system in any way.

Ensuring VSHIELD's integrity VSHIELD contains a self-test at load time. If VSHIELD has been modified in any way, a warning will be displayed. The program will still continue to check for viruses, however. In addition, you can use the VALIDATE program to authenticate the integrity of VSHIELD .EXE. See the section on VALIDATE for instructions. The validation results for Version 66 should be:

```
SIZE: 47,167
DATE: 8-10-1990
FILE AUTHENTICATION:
    Check Method 1 = 474A
    Check Method 2 = 0957
```

You also can call the McAfee Associates bulletin board (see "Registration") to obtain online VSHIELD.EXE verification data. The VALIDATE program distributed with SCAN can be used to authenticate all future versions of VSHIELD.

Registration A registration fee of $25 is required for the use of VSHIELD. Send registrations to the address below. The registration cost covers the copy currently in use and any future versions for one year, provided they are obtained from the McAfee Associates bulletin board or other public or private board. Diskettes will not be mailed unless specifically requested. Add $9 for diskette mailings. The McAfee Associates board number is (408) 988-4004 (1200/2400, N,8,1; 5 lines).

McAfee Associates
4423 Cheeney Street
Santa Clara, CA 95054
(408) 988-3832

Using CLEAN to remove viruses

CLEAN kills and removes computer viruses and, in most instances, it repairs infected files, reconstructs damaged programs, and returns the system to normal operation. CLEAN works for all viruses identified by the current version of McAfee Associates' SCAN.

CLEAN searches the entire system looking for the virus that you wish to remove. When found, the infected file is identified, the virus is isolated and removed, and, for the more common viruses, the infected file is

repaired. If the file is infected with a less common virus that cannot be separated from the file, the infected file is wiped from the disk and deleted from the system. A warning message is displayed by CLEAN before erasing any files, and you have the option of overriding the erase function.

The common viruses that CLEAN is able to remove successfully and repair and restore the damaged programs are:

Jerusalem B	Disk Killer
Alabama	Ping Pong-B
Jerusalem A	Ashar
Ping Pong	Sunday
Jerusalem E	1260
Stoned	4096
Dark Avenger	Yankee Doodle
Pakistani Brain	Vacsina
Suriv03	V800
Payday	Joshi
Alameda	Fish
1701	Vienna
1704	Zerobug

These viruses account for the overwhelming majority of infection occurrences.

Note: .EXE viruses cannot be successfully removed from all infected .EXE files in 100% of the cases. A few EXE programs will be damaged beyond repair by the infection and they will have to be deleted. In all cases, however, the virus in the file will be killed and rendered harmless by CLEAN. Additionally, removing the Stoned virus can cause loss of the partition table in systems with nonstandard disk controllers or systems that use special purpose device drivers for disk access. If you are removing the Stoned virus, back up all critical data before running CLEAN. Loss of the partition table will cause a loss of all of the data on your disk!

Using CLEAN Before running CLEAN, verify the suspected virus infection by running SCAN.EXE. Scan will identify the virus strain and substrain and will display the I.D. to be used as input to the CLEAN program. CLEAN uses this I.D. to determine which virus to seek out and remove. The I.D. for each virus is displayed inside a set of square brackets. For example, the I.D. for the Disk Killer virus will be displayed by SCAN as `[Killer]`. This identifier must be used in the command line of CLEAN to remove the Disk Killer virus.

Before you begin the disinfection process, you must power down the infected computer and reboot the computer from a clean, write-protected system diskette. This step is very important. It will remove the virus from control in memory and prevent the virus from continuing to infect during the clean-up process. After rebooting from the clean diskette, run SCAN on the diskette to verify that it is indeed not infected.

To run CLEAN type:

```
CLEAN [drives] [virusID] [/a] [/many]
```

Note: `[virusID]` is not optional; the brackets must be included.

where:

drives	Drive designators for drives to be cleaned. Up to 10 drives can be cleaned with one command.
`[virusID]`	The virus I.D. (brackets must be included). This parameter is not optional.
/a	Option to check all files.
/many	Option to allow cleaning multiple floppies.

Examples:

```
CLEAN C: D: [Jeru]
```

This command will clean Jerusalem from the C and D drives.

```
CLEAN C:\TEMP [Dav] /a
```

This command will clean Dark Avenger from C:\TEMP and will search all file extensions for the virus.

CLEAN will display the name of each infected file as it is found. When the virus has been removed from each file, a "successful" message will be displayed.

Note: If a file has been infected several times by a virus, CLEAN will display the name of the file and the "successful" message for each infection occurrence. Thus, multiple lines will be displayed for each file infected more than once.

After running CLEAN, run SCAN again, this time with the /a option, to ensure that all remnants of the virus have been removed. Also, after cleaning your hard drives, SCAN all floppies. If any infections are found, remove them with CLEAN.

Ensuring CLEAN's integrity CLEAN contains a self-test at load time. If CLEAN has been modified in any way, a warning will be displayed. The program will still continue to check for viruses, however. In addition, you can use the VALIDATE program to authenticate the integrity of CLEAN.EXE. See the section on VALIDATE for instructions. The validation results for Version 66 should be:

```
SIZE: 77,961
DATE: 8-10-1990
FILE AUTHENTICATION:
   Check Method 1 - 18B6
   Check Method 2 - 0705
```

You also can call the McAfee Associates bulletin board (see "Registration") to obtain online CLEAN.EXE verification data. The VALIDATE program distributed with CLEAN can be used to authenticate all future versions of CLEAN.

Registration A registration fee of $25 is required for the use of CLEAN. Send registrations to the address below. The registration cost covers the copy currently in use and any future versions for one year, provided they are obtained from the McAfee Associates bulletin board or other public or private board. Diskettes will not be mailed unless specifically requested. Add $9 for diskette mailings. The McAfee Associates board number is (408) 988-4004 (1200/2400, N,8,1; 5 lines).

McAfee Associates
4423 Cheeney Street
Santa Clara, CA 95054
(408) 988-3832

Double-check your software with VALIDATE

VALIDATE is a file authentication program that can be used to check shareware and other software for signs of tampering. The program uses two different methods to generate CRC checks for designated files and displays the results. The dual CRC checks ensure a high level of security. The results then can be compared with validation data published by the author or obtained from any reliable information source.

The Computer Virus Industry Association, for example, maintains an online validation service for participating shareware authors. You can contact the CVIA bulletin board at (408) 988-4004 to access up-to-date validation data for VIRUSCAN, SCANRES, SHEZ, LIST, and other shareware programs.

You only need run VALIDATE against the program in question, obtain the authentication numbers, and compare those numbers to the ones on file in the online data base. If they match, you can be assured that the program has not been tampered with.

Using VALIDATE To run VALIDATE, type:

VALIDATE *d*:*path**filename.ext*

The program will display the following validation information:

```
                    Size: (Number of bytes)
                    Date: (File creation date)
File Authentication:
        Check Method 1 - (4-digit CRC)
        Check Method 2 - (4-digit CRC)
```

See FIG. 5-3 for an example of a VALIDATE output.

```
C:\123 >validate 123.exe
VALIDATE 0.3 Copyright 1988-89 by McAfee Associates.  (408) 988-3832

          File Name:  123.exe
               Size:  11,313
               Date:  2-11-1989
File Authentication:
     Check Method 1 - 5E4D
     Check Method 2 - 1088

C:\123 >
```

5-3 The output from VALIDATE can be compared to reliable source information like that from the Computer Virus Industry Association.

Registration VALIDATE can be used free of charge. The only request is that if you do detect a virus with VALIDATE, you report it to

Computer Virus Industry Association
4423 Cheeney Street
Santa Clara, CA 95054
(408) 727-4559

With your help, the CVIA can keep on top of the computer virus situation and find cures for viruses before they develop into epidemics.

CMOS_RAM and CHECKMOS (Disk 1781)

Special requirements These programs are useful only if you have an AT-compatible or any computer that stores its setup in battery-backed RAM using the IBM AT standard.

There was a time when adding memory, or a disk drive, or a coprocessor to your system involved paging through the manual to figure out how to set DIP switches and move jumpers inside the computer. With the AT, and nearly every PC made since, the technology has changed for the better. Instead of switches and jumpers, a small amount of RAM is used to tell the PC how much memory it has, what type of disk drives it has, and so on. AT-like machines have a clock and calendar to keep track of the time of day and the date. This information is stored in the same area of RAM. Power is supplied continuously to this RAM from a battery, so it does not lose its vital information when the PC is turned off. The type of memory chip used, called a CMOS chip, draws very little power and is thus well suited to the service.

Specifically, the information stored is:

- Clock information
- Diagnostics status byte

- Shutdown status byte
- Diskette drive type byte (drives A and B)
- Fixed disk drive byte (drives C and D)
- Equipment byte (number of diskette drives, display adapter and math coprocessor)
- Low and high base memory bytes
- Low and high expansion memory bytes
- A checksum byte to confirm the validity of the stored data

Generally, your PC manufacturer will supply you with a special program to allow you to enter all of the necessary hardware setup information. This program must be run when the PC is initially configured with its own floppy drive, hard drive, video adapter, etc. If you install any new hardware, you (or the technician that installs it) must run the program again. Your setup program is either included with your operating system programs, in your PC's ROM (read-only memory), or both. If it's included with your operating system, you can run it by typing its name (usually the name is something like SETUP). If it's in your PC's ROM, you probably have to press a combination of keys to run it. Refer to the instructions that came with your PC for details on how to run your setup program. Read them and be sure you understand them.

A problem arises when the batteries that preserve the setup information go dead. Even the rechargeable ones eventually go dead. It's not a question of if your batteries go dead, it's a question of when. On the inevitable day when your batteries quit, all of the setup information will be lost. What happens then depends on what kind of PC you have. Some go completely dead. Some allow a floppy drive to operate, but that's it.

Restoring all of the setup information can be an arduous task. Do you remember how many cylinders and heads your hard drive has? Probably not.

CMOS_RAM saves your hardware setup information directly from the battery-backed RAM to a disk file. After your batteries go dead, you can use CMOS_RAM to quickly restore your hardware setup when you've installed new batteries.

Using CMOS_RAM There are actually two programs provided. CMOS_RAM.EXE allows you to save your setup configuration to a disk file and, later, to restore it from the file back to you computer's battery-backed RAM. The other program, CHEKCMOS.EXE, will verify that the information stored in the disk file matches the information in the battery-backed RAM.

The first thing to do is to run CMOS_RAM.EXE. Simply run it as a command with no parameters. At the DOS prompt type:

```
CMOS_RAM
```

CMOS_RAM displays the menu shown in FIG. 5-4. Press the number corresponding to the option you want.

```
        CMOS RAM Save/Restore Program
           T. Mosteller 08/21/89

Desired Function:

1: About the CMOS RAM
2: Save the contents of your CMOS RAM to a disk file
3: Restore the CMOS RAM from the disk file
4: Set the CMOS clock
5: Exit
```

5-4 CMOS_RAM is menu-driven.

Option 1 simply displays several screens with some basic information about the CMOS_RAM program and its use. Option 2 is in fact the one to pick first. When you choose Option 2, CMOS_RAM will copy the contents of your PC's battery-backed RAM into a file called CMOS.RAM. CMOS.RAM will be stored in the default directory.

The third option is for use after you've experienced a battery failure. When you have replaced the battery, choose Option 3 to restore your PC's setup configuration back to the battery-backed RAM.

After a battery failure, you will need to reset PC's internal clock with Option 4. When you choose Option 4, you will see the screen shown in FIG. 5-5. Enter the new time and date, and CMOS_RAM will reset the internal clock. This option also will be useful at other times (when switching to daylight savings time for instance). Note that, with MS-DOS 3.3 and later, the TIME command provided by DOS also will reset the internal clock.

```
CMOS Clock Setting Routine

Please enter the following information in the format specified:

Time in 24 hour format (HH:MM:SS)?
```

5-5 Option 4 lets you set the internal clock.

Once you've saved your setup configuration to the disk file CMOS.RAM, you will want to be sure that the information in the file stays the same as the information in your battery-backed RAM. Verifying the accuracy of the information is the purpose of CHEKCMOS.EXE. The best way to use CHEKCMOS is to put it in your AUTOEXEC.BAT file. Include the command

```
CHEKCMOS
```

in AUTOEXEC.BAT. Every time your PC boots up, CHEKCMOS will compare the contents of the disk file, CMOS.RAM, and your battery-backed

```
C:\>chekcmos

THE CMOS RAM CHECKS OUT OK!!

C:\>
```

5-6 This message is what you should expect to see when you run CHEKCMOS.

RAM. If everything checks out, you'll see the message shown in FIG. 5-6.

Note that the file, CMOS.RAM, must be in the default directory in order for CHEKCMOS to find it. If it is not or has been inadvertently erased, CHEKCMOS will beep and display the message shown in FIG. 5-7.

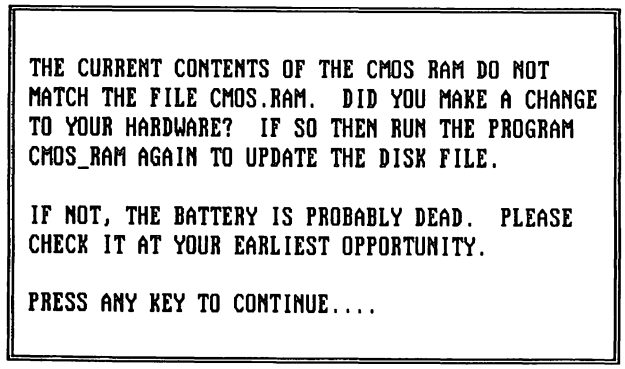
```
UNABLE TO FIND THE FILE CMOS.RAM.  IS THE FILE
IN ANOTHER DIRECTORY, OR DID YOU FORGET TO RUN
THE CMOS_RAM PROGRAM??

PRESS ANY KEY TO CONTINUE....
```

5-7 CHEKCMOS tells you if it can't find the CMOS.RAM file.

If, for some reason, the contents of CMOS.RAM do not match those of your battery-backed RAM, CHEKCMOS will beep like a siren and will display the screen in FIG. 5-8. This warning will occur most likely if you forget to rerun CMOS_RAM Option 2 after you've changed your setup configuration (for example, when you install a new disk drive or a coprocessor). It also could mean a battery failure is imminent.

Preparing for disaster In essence CMOS_RAM is an insurance policy against battery failure. To ensure that it pays in the event of a battery failure, you'll need to take some preparatory steps. The best way to be prepared is to create what we'll call a disaster floppy.

The disaster floppy should be formatted as a system disk and should contain the COMMAND.COM program, so you can boot directly from it. Run CMOS_RAM and pick Option 2 to copy your setup configuration to CMOS.RAM. Then, copy both CMOS_RAM.EXE and CMOS.RAM to the



5-8 If you see this message, it could mean trouble; however, it probably just means that you changed your setup without running CMOS_RAM.

disaster floppy. Remember that any time you change your setup configuration, you should run CMOS_RAM Option 2 again and copy the new CMOS.RAM file to your disaster disk. Make a backup copy of the disaster disk and put it in a safe place.

When your batteries fail, you can probably replace them yourself with the instructions supplied with your PC. If you're uncomfortable with that, have a competent technician do it. After the batteries have been replaced, put your disaster disk into drive A. Note that if your setup program is in your PC's ROM, you might have to run it to activate drive A. Boot your PC from the disaster disk and run Option 3 of CMOS_RAM. Assuming no additional disasters have occurred, you should be ready to go.

Incompatibilities No incompatibilities have been found with CMOS_RAM and any PC BIOS (Basic Input/Output System). CMOS_RAM has been tested thoroughly with Phoenix, Award, and AMI BIOSs, assuring compatibility with the vast majority of AT-like PCs. However, it is not necessarily compatible with every AT-like PC ever made. Be assured that if incompatibilities do exist with your PC, it should not damage your system in any way.

Registration To register CMOS_RAM, send $5 to

Thomas Mosteller
1872 Rampart Lane
Lansdale, PA 19446

6
Printer utilities

In the past few years, the quality of printers on the PC market has risen dramatically. Not long ago, everyone was using dot matrix printers that produced printouts that were unmistakably computer generated, not to mention a little hard to read. If you wanted a better quality printout, you could use a daisy wheel printer. They were slow, noisy, and made printouts that looked like they were done on a cheap manual typewriter. However, they still produced better quality than dot matrix printers. Since then, ink jet and laser printers have been perfected. As their prices have dropped, these far superior printers have pushed the daisy wheel into near extinction. Dot matrix printers remain, mostly due to their low cost. The latest 24-pin dot matrix printers can put out surprisingly high quality documents. However, suppose you still have a perfectly good 9-pin dot matrix printer, and you'd rather not reinvest several hundred dollars in a new printer? Read this chapter and you might find an answer in the LQ Printer Utilities.

No other operation slows computing down more than printing. Even with the fastest printers, your processor spends the vast majority of its time idling during printouts. In the meantime, there is nothing for you to do but wait for the printout to finish. Wouldn't you rather be working at your PC while the printer takes its time printing? You can, if you use a spooler like Disk Spool II. The term spooling comes from the time honored computer practice of temporarily saving the output from a CPU on magnetic tape (which is typically wound on a spool) and later recalling it for further processing. In computer terms, spooling means saving it until later when you can get around to it. It's much faster for the CPU to send the output to a disk (or a portion of memory) and then return to what it was doing. Later, when the CPU is not so busy, it can recall what it has

saved ("despooling") and print it or do whatever else it was going to do with it. As you work at your PC, despooling can take place, literally, between keystrokes, so you can continue your work while simultaneously printing out a document. Unlike many other spooling programs, Disk Spool II is full-featured, giving you a great deal of control over how and when your documents will be printed.

Part of the power of the HP LaserJet and DeskJet printers and their compatibles is their ability to print in a variety of fonts. Generally, these printers come with a few internal fonts that are always available. You also can include additional fonts with add-on font cartridges. A less expensive alternative is to buy soft fonts that you can keep on disk and download them into your printer's memory whenever you need them. Included in this chapter are the shareware versions of the HP LaserJet and DeskJet soft fonts, which provide a variety of fonts for a price well below that of other commercially available fonts.

You often can run into a situation where you wish that your printer paper were just a little bit wider (for example, when you're working with wide spreadsheets). You find yourself trying to squeeze everything together, eliminating columns, using the printer's compressed mode, and finally getting out the tape and attaching pages side by side. Wouldn't it be great if you could print sideways? Using On Side, you can do just that. You can also scale the size of the lettering, choose different fonts, or even create your own fonts.

Also included in this chapter is Swap Shop, a collection of utilities that allow you to swap parallel ports and serial ports. If you have many peripheral devices connected to your PC, the Swap Shop utilities will keep you from spending a lot of time behind your desk switching cables around.

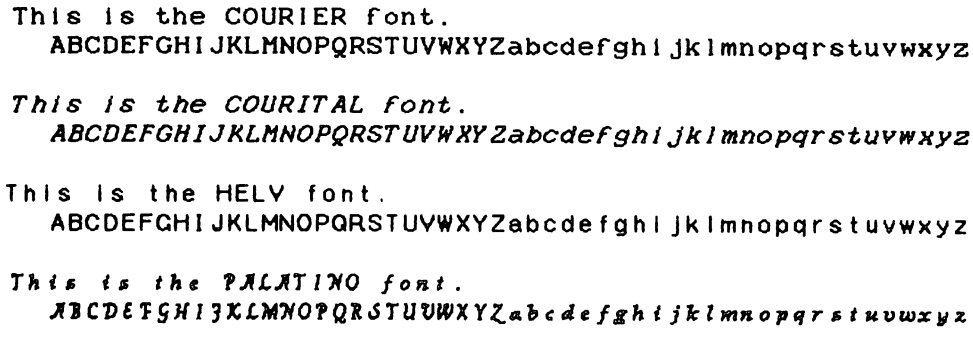
LQ Printer Utility (Disk 718)

Special requirements Epson- or IBM-compatible printers are preferable but are not required. Most 9-pin printers are supported, but you might have to install or create a configuration file if your file deviates significantly from Epson's (see the section on configuration files).

LQ will allow you to produce high-quality text on inexpensive dot matrix printers. LQ offers these features:

- LQ can be "locked" into memory to function inconspicuously with your favorite word processor or other program, or it can be used only as needed to process disk files.
- Most control sequences for turning on special modes (boldface, underline, superscript, etc.) will produce the corresponding results with LQ, so you might not have to modify your word processor to accommodate LQ.

- LQ includes a print spooler that can be set to any length from 1 to 400K characters. The spooler has been customized to efficiently work with LQ's long graphics sequences (using about 1/40 the space required by a conventional spooler). You can continue using your computer for other tasks while documents print in the background. If you use single sheet feed, LQ will interrupt your work to prompt you to change paper, then return you to the point where you were interrupted.
- The spooler and several of LQ's options can be controlled using a pop-up window, which is available at any time. This window is particularly convenient for toggling the letter-quality mode on and off and for flushing the buffer to abort a printout.
- Special modes, such as proportional spacing, extra large type, and graphics printing, are available. A letterhead editor is included for making customized logos to be printed with LQ.
- Four fonts are available at any time, and others can be swapped into memory when desired. You can switch between these fonts using codes in your text or by using the LQ control window. Some example fonts are shown in FIG. 6-1.
- You can modify an existing character set or create your own from scratch using the EDCHAR program included in the package.



6-1 Example LQ fonts. These are the four default fonts.

LQ installation

There is a good chance that your printer is Epson-compatible and is already configured properly. If so, you can probably skip this section.

There are two levels of installation that you might need to perform in order to use LQ. You should configure your word processor or other application for an Epson MX 80 (or IBM Graphics Printer) if it uses control

codes to exploit a printer (to print italics, emphasized print, etc.). You should run LQINST if you have a printer which is not Epson-compatible (or if you want to change the size of the buffer, assign a different key combination to bring up the LQ control window or change the default character sets used by LQ).

LQ will make your printer appear to a word processor as an Epson MX 80 (or IBM Graphics Printer) when printing in the letter-quality mode. Most word processors will let you choose a printer when a document is printed, so you can maintain one printer description file for draft mode (based on what your printer really is) and another one for LQ mode. For example, PC-Write gives the prompt

```
Print control file name (Esc:exit Enter:none):
```

and MultiMate lets you select a PAT (Printer Action Table) file when documents are printed.

Installing LQ with LQINST

LQINST alters the LQ.COM program, so it is wise to make a copy of the LQ disk before starting the installation procedure. Insert a working copy of the disk in your computer's default drive and enter `LQINST`. You will be prompted to enter the disk containing the file LQ.COM. Since this file is on the distribution disk, no disk exchange is necessary. Throughout this installation procedure you can ignore messages to insert disks if you are working with a copy of the distribution disk. Later on, if you use separate disks for different character sets or other LQ data, you should swap disks as prompted. The screen now should look like FIG. 6-2.

```
LQ installation menu:

1. Change default character sets.

2. Change printer parameters.

3. Change keys for LQ window.

4. Change buffer size.

5. Quit.

     Which? (1 - 5)
```

6-2 The menu for the LQINST program.

Each option will be described below, but if this is your first use of LQ you will probably be content to use only option 2 (and that only if your printer is not Epson-compatible).

Option 1 *Change default character sets.* The LQ.COM program includes four character sets within its code: COURIER, COURITAL, HELV, and PALATINO. If your use of other sets is infrequent it is best to load them explicitly using the LQ parameter line (see the section on the parameter line). However, if you would like different sets to be used by default, then this installation option is in order. Installation of a new set is a two-step process. First, you indicate which set you want to install, then you assign it a number (1 to 4) that is used to turn on the set.

After this option is selected you are shown a list of character sets and prompted to enter the number of the set to install (FIG. 6-3).

```
 1  COMPUTER        21  SANSITAL
 2  COURIER         22  SANSSER
 3  COURIER2        23  SANSSER2
 4  COURITAL        24  SCRIPT
 5  DECO            25  SPIRAL
 6  GOTHIC
 7  GREEK
 8  HELV
 9  HELV2
10  HELVITAL
11  HOLLOW
12  IBM1
13  IBM2
14  MAIN
15  MAINITAL
16  PALATINO
17  ROMAN
18  ROMAN2
19  ROMANITA
20  SANS2ITA

Enter number of set to install (or just <Enter> to quit):
```

6-3 This menu lets you install up to four fonts.

After you enter the number of the set to install you are prompted to

`Enter installed character set number (1-4):`

This second number is used in control sequences, in the LQ parameter line, or in the LQ Control Window to switch to the corresponding set. Any of the four sets can be used at any time, but the first two sets have special roles of which you should be aware. The first set is used by default, so it should be the one you use most often. The second set can be turned on by the control sequence you normally use to switch to italics, so it is best to

make it the italicized version of the first set. For example, you could make the first set SANSSER and the second SANSITAL.

After you enter the installed character set number, the cycle is repeated. You are prompted again to choose a set to install. You can continue until all four sets are changed, or you can retain previous sets for those you don't change. When you are finished, press Enter without typing a number.

The changes you make in this and other LQINST options are not made permanent until you exit the program, so don't worry about doing anything lethal. Even if you do save a revised version of LQ.COM, you can always run LQINST again to restore it to the way it was.

Option 2 *Change printer parameters.* The second option lets you change the default Epson printer parameters to those for another printer. Printer parameters are contained in files with the extension .PAR that you can edit or create yourself. If you are a registered LQ user and experience problems installing a non-Epson printer, the authors will try to create a parameter file for you on request.

Note: After you have performed this installation process, your LQ/printer combination will act like an Epson MX or IBM Graphics Printer regardless of what kind of printer you actually have. When using LQ, you should make certain that your word processor or other application thinks you have one of these models.

When you select this option you are prompted to insert the LQ disk, then you are shown a list of all parameter files on the disk. Currently these are:

1 EPSON
2 IMAGE
3 PROPRINT
4 CITOH
5 STAR

A given file might work for more than one type of printer. For example, the Epson parameters are appropriate for the IBM Graphics printer. Enter the number of your choice.

Some experimentation might be required to find or create the right file. Rest assured that you won't do any harm by installing the wrong parameters. Your printer may appear to run amuck, but the only cost is the paper.

Option 3 *Change keys for LQ window.* There are four shift keys on the PC keyboard: Ctrl, Alt, left Shift, right Shift. Many background utilities use combinations of these keys to spring into action. For example, Sidekick normally requires that the Ctrl and Alt keys be depressed simultaneously. The LQ Control Window is normally brought up by pressing the left and right Shift keys together, but you change this combination to any pair of

shift keys. Use LQINST to make this change permanent or use the K option to pass the key combination (temporarily) on the LQ parameter line.

When the third option is selected, the screen in FIG. 6-4 is displayed. As soon as you press the desired key combination, you are returned to the main menu of LQINST.

```
Key installation.

The pop-up window used to control LQ operation is normally brought
up by pressing the right and left shift keys simultaneously.

You can change this combination to any two of the following:

Ctrl

Lft Shift          Rt Shift

Alt


Press the two keys you would like to use:
```

6-4 Option 3 allows you to set the hotkey for LQ.

Option 4 *Change buffer size.* Printing in LQ mode is slow enough that you will not enjoy sitting idly by waiting for a printout to finish. LQ includes a print spooler for printing in the background while you use your computer for other tasks. The default size of the buffer used by this spooler is 16K, which will accommodate about six pages of text. You can change the buffer size to any value from 1K to 400K. When you select option 4 you are prompted to enter this value. For example, if you want a 20K buffer, enter the number 20.

Option 5 *Quit.* The last option is used to exit from LQINST. If you have made changes you are prompted

```
Save modifications? (Y,N)
```

If you press N, then LQ.COM is unchanged, otherwise all changes you have made in this LQINST session are made permanent. (You can always run LQINST again to make further changes.)

Using LQ in the resident mode

The preferred way to use LQ is in the resident mode in which LQ stays in memory while other programs are running. This mode offers print spooling and the control window for changing LQ's parameters. The disadvan-

tage of the resident mode is the memory consumption. With the default 16K buffer, the program uses about 90K of RAM. If you don't have enough memory to run other programs with LQ installed you should use the file mode described in the next section. While the latter mode is less convenient, you can still obtain exactly the same printouts.

If you want to use LQ as a resident program for only part of your sessions on the computer you can enter

```
LQ R
```

to remove LQ from memory. This command works only if no other resident programs have been loaded after LQ. If you plan on using this technique, load LQ last (after installing other programs, such as Sidekick).

To load LQ in the resident mode simply type LQ at the DOS prompt. A variety of options can be set by adding parameters to this entry. For example,

```
LQ C1'SANSSER'
```

loads LQ and replaces the first character set with SANSSER.SET. (A full description of command line parameters is given later.)

Once LQ is loaded you generally can use your accustomed software, with no changes other than improved printouts. (You might have to change your word processor's printer description table to accommodate an Epson MX 80 or IBM Graphics Printer.)

The spooler A print spooler is a program that directs pending printouts to an area of memory (buffer) and sends characters from this intermediate storage to the printer only when the computer is relatively idle. The process takes place in the background, so you can use your word processing program or another application without interruption. A number of good print spooling programs are available, some of them public domain.

LQ obtains its high quality print by printing in the graphics mode, which presents special difficulties for a conventional spooler. Without LQ, a character is sent to the printer as a single byte or unit of information, but LQ requires about 40 bytes to "draw" a single character. A single page of text can balloon to over 100K, more than enough to fill the typical buffer. Once the buffer is full, a spooler no longer yields any advantage, because other activities must stop until the backlog subsides.

LQ includes an integrated spooler with a default buffer of 16K. Characters are spooled in the standard compact form and expanded to graphics in small increments. The default buffer size will accommodate about six pages of text, and you can increase the size to as much as 400K. The spooler also works in draft mode (with LQ loaded, but turned off), so it might be attractive to keep LQ in memory, even if your demands for letter-quality print are infrequent.

If you find that a pending printout contains an error (such as spelling or formatting), you will probably want to abort the printing and correct

your document. To abort a printout, you must flush the buffer. You must tell LQ to stop printing and to ignore the presence of any remaining characters in its queue. Aborting entails a single keystroke in the LQ control window described below.

The LQ control window There are three ways to select options in LQ:

1. In the LQ command line. For example, when you enter
   ```
   LQ C1'SANSSER'
   ```
   at the DOS prompt to load the character set SANSSER.
2. Using control sequences embedded in your text, such as Esc, Esc, 2 to switch to character set number 2.
3. Using the LQ Control Window.

When LQ is in the resident mode you can bring up the control window by simultaneously pressing the right and left Shift keys (or another pair of shift keys you installed with LQINST). The cursor is initially positioned at the "Yes" on the first line. The keys you can use are:

down arrow	Move down a line
up arrow	Move up a line
space bar	Change this option
A	Advance the printer
Esc	Exit the menu

The options you can change are:

Flush the buffer If you press the space bar on this line, any pending printout is aborted. Use this option to remove an errant document from the buffer.

Change character set The character set number is rotated one set. If character set number 2 is currently in use and the space bar is pressed, then set number 3 will be used at the next opportunity.

Wait at form feeds The space bar toggles the status of LQ's response to a form feed character (ASCII code 12). When this option is set to "Yes," LQ will interrupt a program in progress after a form feed is received and prompt you to change paper. In response to the prompt, pressing Enter will continue printing and pressing Esc will abort printing. In either case, you are returned to the program you were using without interference.

Proportional print You can set proportional print on or off. Using proportional print, the sequence "iiii" will occupy less space than "MMMM." This option makes text more attractive but disrupts the spacing of tables and text separated by white space. Try this option to see if it is appropriate for your document style.

Lines per page The default line spacing, and the one normally expected by other programs, is 66 lines per page. If you want to change this, press

the space bar and then enter the new value. Because of physical limitations of your printer, not all these values are possible. For example, if you enter the number 58, it might be increased to 59 (the nearest acceptable value).

LQ enabled The LQ mode can be toggled on and off. In the "off" setting your printer will operate as if LQ were not installed, except that print spooling will still be functional.

Advance Pressing A any time the control window is open will result in a small ($^1/_{216}$") advance of the paper when the window is closed. With many printers, the first line of a printout might appear smudged. Advancing the paper with this option will fix the problem. This operation is done automatically in the LQ file mode or when LQ is loaded in the resident mode (if the printer is on). You also can perform this action by embedding the Esc, Esc, B control sequence in your text.

When you are finished using the Control Window, press Esc to return to your previous application.

Using LQ in the file mode

When LQ is run with the F option, a file is printed in letter quality but LQ does not remain resident. An example using this option is

```
LQ F'MYFILE'
```

which prints the file MYFILE. The primary reason for using the file mode is to accommodate systems with insufficient memory for using LQ in the resident mode. (Another reason is for using LQ in batch files for printing letterheads and other designs.) Because LQ is not resident in the file mode, no spooling is performed, and you must wait for a printout to finish before using your computer for other tasks or use the DOS PRINT command as described below. Also, the control window is not available in the file mode.

You can use a variety of options in the LQ command line. For example

```
LQ F'MYFILE' W
```

prints MYFILE and waits at form feeds for paper to be changed. See the section on command line parameters for a complete description of available options.

When using the F (file) option, you can stop printing at any time by pressing a key. You then will be asked if you want to abort the printout or continue.

The way you create files to be printed by LQ varies from one application to another. Most word processors store documents in special formats that make sense only to the program itself. These are the "source" documents. You do not want to print these files but rather the "output" docu-

ments that correspond to the characters that would normally go to the printer. For example, when a user asks WordStar to print a file the program prompts

```
Output to disk file?
```

and gives the user a chance to channel output to a file that would otherwise go to the printer. Such an output file also is called an ASCII file because it contains only standard ASCII character codes.

PC-Write is another popular word processor that produces ASCII files easily. The command

```
PR MYFILE
```

formats and prints the source document MYFILE, and the command

```
PR MYFILE YOURFILE
```

sends the output to the second file YOURFILE instead of a printer. The vast majority of word processing, database, and spreadsheet programs on the market can produce ASCII files. Consult your program's manual for details.

If you have a previously created text file "printout" that you want to print in a letter quality mode, you can take three different approaches.

```
LQ F'filename' [parameter list]
```

will function as described above. You can enter

```
COPY filename PRN
```

if LQ is resident in memory. The final alternative requires a lot of disk space (preferably a hard disk) but has the advantage of printing in the background without tying up memory as when LQ is resident. If you enter

```
LQ F'filename','filename2'
```

(no spaces after the F), then all the graphics characters that would have been printed go to the second file *'filename2'* instead. This file will be about 40 times as big as the first file, so make sure you have room on your disk before proceeding. Assuming that you have the program BPRINT .COM, you now can enter

```
BPRINT filename2
```

without LQ being resident. You can continue to use your computer as your file is printed, and you won't sacrifice the RAM that LQ would otherwise occupy. (See the section "Additional programs" for a full description of creating and using BPRINT.) If the file is short (as with a letterhead) you might want to type

```
COPY/B filename2 PRN
```

(again without LQ being resident) rather than spooling the file with

BPRINT. (The /B option lets the graphics codes used by LQ go to the printer without interference from DOS.)

In any of these three cases, you might want to add additional control codes within the text before printing. (The "Control sequences" section contains a list of control codes and their functions.) For example, suppose you have used your word processor to create an output file with the lines

```
This is a test.
This is only a test.
```

The control sequence used to initiate a line of large characters is Esc, Esc, L. There are a couple of ways to insert these codes before the first line. If you have Sidekick on your system, you can enter a control code, such as Esc, by first pressing Ctrl-P, so you would position the cursor at the start of the first line and type

Ctrl-P, Esc, Ctrl-P, Esc, L

(The same technique works with WordStar.) A more universal (but less convenient) method is to use EDLIN.COM, the line editor that is included with your DOS system disk. You can edit a given line in the same way you edit a line at the DOS prompt. Assuming you had saved the previous file under the name MYFILE, you would begin your EDLIN session by entering

```
EDLIN MYFILE
```

Find the number of the line you want to edit by using the List or Search commands (see the DOS manual for details), then enter this number to edit the line. In this case, we know in advance that we want to edit the first line, so we would enter the number 1. The screen should show

```
1:*This is a test.
1:*
```

Control characters can be entered by using the Ctrl-V prefix. For example, Ctrl-T can be entered by typing Ctrl-V, T, and Esc can be entered by typing Ctrl-V, [. Press Ins to enter the insert mode, then type Ctrl-V, [, Ctrl-V, [, L. Press F3 to display the rest of the buffer (`This is a test.`) and press Enter. To save the modified file, enter E.

Many word processors (including PC-Write) allow the direct entry of control codes, so you might not need to go through such an extra step to use LQ's special features.

Control sequences

A control sequence in a document is a sequence of codes or characters that has a special meaning to your printer (or the program controlling it) and that changes the way subsequent characters are printed. You proba-

bly have used such codes for some time, perhaps without realizing it. When you tell your word processor to print a book's title in boldface or to print a subscript, you are telling your software to insert the appropriate control characters for performing these functions.

Regardless of what kind of printer you are using, LQ will make your printer appear to a word processor or other application as an Epson MX 80 (or IBM Graphics Printer). Assuming that you have installed your application program for this printer you can get extensive use out of LQ without any direct involvement with control sequences.

If your program does not support all the features of an Epson MX 80 (italics, underlining, emphasized print, superscript/subscript, etc.) or if you want to use some of the special features of LQ (large characters, proportional print, or graphics), you will need to insert control codes on your own. You can always use EDLIN.COM to do this; however, you probably have an easier way at your disposal.

If the LQ feature you want to use will not change during a printout, you can request it in the LQ command line rather than using control sequences. For example, LQ C3 turns on character set number three (out of the four in memory), as an alternative to placing Esc, Esc, 3 within your document. The LQ command line options are described in the following section.

In addition to inserting control codes or using the control window to switch character sets, one other technique is available. Most word processors have a way of turning on italics. Because the italic set is expected to be the second of LQ's four sets, you can change to any second set by turning on italics. If you want to use this method, have LQ load the desired alternate character set with a command such as

```
LQ C2'SANSSER'
```

(which loads SANSSER.SET as character set number 2, replacing italics).

Control functions available in LQ

The following is a list of LQ functions that can be used within a document using control sequences. Most of these duplicate standard Epson control codes. Functions which differ from the Epson standard (generally beginning with Esc, Esc) are indicated with an asterisk. Each control sequence is shown in two forms: the sequence of keys to press, then the corresponding sequence of (decimal) ASCII codes. For example,

Esc, E = 27,69

indicates that the sequence consists of the Esc key code followed by the code for the capital E character. The standard codes usually are inserted automatically by a word processor when the associated mode is requested, but the additional LQ modes must be added explicitly.

Turn on double-wide print:
Ctrl-N = 14

Turn off double-wide print:
Ctrl-T = 20

Turn on underline:
Esc, -, *N* = 27,45,*N* where *N* corresponds to any code except 0 or "0". For example, use Esc, -, 1 = 27,45,1.

Turn off underline:
Esc, -, *N* = 27,45,*N* where *N* corresponds to either "0" or 0. For example, use Esc, -, 0 = 27,45,48.

Set line spacing to N/216":
Esc, 3, *N* = 27,51,*N* where 1 <= *N* <= 255

Turn on italics (character set #2):
Esc, 4 = 27,52

Turn off italics (turn on set #1):
Esc, 5 = 27,53

Sets line spacing to N/72":
Esc, A *N* = 27,65,*N* where 1 <= *N* <= 85

Turn on boldface:
Esc, E = 27,69 or Esc, G = 27,71

Turn off boldface:
Esc, F = 27,70 or Esc, H = 27,72

Superscript:
Esc, S, # = 27,83,# where # corresponds to "0" or 0. For example, Esc, S, 0 = 27,45,48.

Subscript:
Esc, S, # = 27,83,# where # corresponds to any code except 0 or "0". For example, use Esc, S, 1 = 27,45,49.

Superscript/subscript off:
Esc, T = 27,84

*Switch to character set *n* (1 <= *n* <= 4):
Esc, Esc, *n*. For example, Esc, Esc, 3 = 27,27,51 turns on character set number 3.

*Advance the paper to put tension on the paper (recommended for preceding first line of printout; this function is performed automatically when the F (File) option is used.):
Esc, Esc, B = 27,27,66

Turn on graphics mode:
Esc, Esc, C = 27,27,67
The graphics mode suppresses the normal space between characters and between lines, so you can produce letterheads and other pictures.

*Turn off graphics mode:
Esc, Esc, D = 27,27,68

*Turn on elite (12 cpi) printing:
Esc, Esc, E = 27,27,69
The best character set for using elite is HELV (character set 3 in the default installation), so you might want to turn on elite printing in this set with

```
LQ MN C3
```

Other narrow sets are appropriate for elite, but don't use the wider sets such as COURIER (default set 1).
Proportional spacing is not supported in elite. If such spacing is desired, use the same set in pica mode.

*Turn off elite printing, restore pica (10 cpi):
Esc, Esc, F = 27,27,70

*Turn on triple-high (large) characters in the current set:
Esc, Esc, L = 27,27,76
The large mode stays on for all lines until Esc, Esc, M is received. The line containing this second sequence is printed in the normal size.

*Turn off triple-high characters:
Esc, Esc, M = 27,27,77

*Turn on proportional spacing:
Esc, Esc, p = 27,27,80

*Turn off proportional spacing:
Esc, Esc, Q = 27,27,81

*Set line space to *n* units (where one unit is either $^1/_{144}$″ or $^1/_{216}$″ depending on the smallest line advance your printer supports):
Esc, Esc, S, # = 27,27,83,#
where # is the number (from 1 to 255) of increments desired. For example, the smallest Epson line advance is $^1/_{216}$″, so Esc, Esc, S, $ = 27,27,83,36 sets the line space to $^{36}/_{216}$″ = $^1/_6$″. It is generally easier to use the L (Lines per page) parameter when activating LQ or the lines per page option in the control window to determine the number of lines on an 11″ page.

*Wait for key to be pressed at page breaks:
Esc, Esc, W = 27,27,87

*Don't wait at page breaks (the default):
Esc, Esc, X = 27,27,88

Other ASCII codes

LQ supports IBM graphics characters (ASCII codes above 127). Codes 128 to 159 correspond to the first 32 characters in set number 3 and codes 160 to 255 to all of set number 4. To use graphics characters, the sets IBM1 and IBM2 should be installed as sets 3 and 4. For consistency, you might want to use the sets MAIN and MAINITAL for the first two sets as well (though this probably will not be important). Hence you can load LQ with

```
LQ C3'IBM1' C4'IBM2' or
LQ C1'MAIN' C2'MAINITAL' C3'IBM1' C4'IBM2'
```

You can make these assignments permanent with the LQINST program. (If you are using PC-Write and want to use foreign characters, put a $A in your PR.DEF file.)

If you are using the graphics characters to create borders or other designs, you might want to change your line spacing to avoid gaps in vertical patterns. Your word processor might take care of this automatically. If it doesn't, use the control sequence

Esc, A, 8 = 27,65,8

to change the line spacing to $^{8}/_{72}$".

Three additional control codes are recognized by LQ: 10 (line feed), 12 (form feed), and the 13 10 (carriage return, line feed) sequence. All other control codes (ASCII codes less than 32) besides those listed above (or the substitutes given in a parameter file) are ignored. In particular, LQ does not support the backspace character, nor does it support the carriage return code by itself. The most common situation in which this causes a problem is when a word processor tries to bold face or underline text by backspacing (or sending a carriage return) and retyping the text or the underline character. The solution is to convince your word processor to turn bold face or underlining on and off with the control sequences described above. Usually, you can assign control sequences as part of the installation process for your word processor or by explicitly entering control sequences yourself. If this process is not clear, you might want to call the technical support department of the company that distributes your word processor. Most programs won't have this problem to begin with, so don't worry unless your printouts appear to stutter.

Entering control codes directly is a last resort. Ideally, your word processor should enter them for you. Here are some examples of control code entry.

In WordStar you can insert control characters by pressing Ctrl – P first. For example, the sequence to turn on emphasized printing is Esc, E, so you would press

Ctrl – P, Esc, E

(a total of 3 keystrokes). You will see

```
^[E
```

on your screen. If you want to underline the last word in "This is a test," you will see

```
This is a ^[Etest^[F
```

(Esc, F turns off emphasized print.)

In PC-Write, you can enter any code by using the Alt key along with the numeric keypad. For example, to enter Esc, which has an ASCII code of 27, hold down Alt and press the 2 and the 7 on the numeric keypad. Now, release Alt.

In WordPerfect, you can insert control codes in your document by using angle brackets. For example, to switch to font 3 you can insert <027><027><051>, which will send Esc, Esc, 3 to LQ.

The LQ parameter line

An easy way to set one-shot LQ options is in the command line when LQ is installed. For example if you want proportional spacing for all your printing,

```
LQ MP
```

will install LQ with the proportional mode turned on. The LQ file must be loaded each time an LQ command is given. Therefore, if LQ is not on the default drive, give the full pathname for LQ (e.g., B:LQ MP, if LQ is on the disk in drive B). You can select as many options as you like in a single line by separating parameters with spaces. For example,

```
LQ MPE F'MYFILE' W
```

turns on proportional spacing, uses emphasized printing for the file MYFILE, and pauses at form feeds. This section lists all command line options. Parameters are shown in uppercase, but you can mix upper- and lowercase freely.

B Set the buffer size (1 to 400K). For example, LQ B64 dedicates 64K of RAM to the print spooler. The default is 16K. The command LQ BF flushes the buffer. (It is easier to flush the buffer using the control window.)

The buffer can be installed only when LQ is first loaded. To change the buffer size, first remove LQ (see the R option below) then load it again.

C Specifies a character set in memory, or loads a new set. Four sets are embedded in LQ, and the first of these normally is used as the default. LQ C4 switches printing to the fourth set. When used in this way, C can be followed by one of the digits 1, 2, 3, or 4. The standard sets installed in LQ

are:

1 COURIER.SET
2 COURITAL.SET
3 HELV.SET
4 PALATINO.SET

These defaults can be changed with the LQINST program described earlier. You can see a list of all character sets on the LQ disk by typing DIR *.SET at the DOS prompt.

If the C option is followed by a filename in quotes, the character set having this name is loaded to the indicated set number. For example:

```
LQ C2'PRETTY'
```

would load the character set PRETTY.SET as set number two (without switching to it). The SET suffix is the default; you should stick with this naming convention to maintain compatibility with the character editor, EDCHAR. You can load a set and simultaneously switch to it by using C in both contexts; e.g.,

```
LQ C2'PRETTY' C2
```

You can load all four sets in one line:

```
LQ C1'FIRST' C2'SECOND' . . .
```

You also can use pathnames in the file specification:

```
LQ C1'/MYDIR/FIRST'
```

D Loads LQ in draft mode. This option is useful if you want to use LQ's spooler without switching to the LQ mode. You can always toggle the two modes with LQ's pop-up window.

F If you have a file named MYFILE, the command

```
LQ F'MYFILE'
```

will print MYFILE without locking LQ into memory. This option is important if your computer doesn't have enough memory to keep LQ resident or if most of your printing is in draft mode. The file to be printed should be a standard text file, possibly containing some of the control sequences. You can send LQ's output to a file rather than to the printer by giving a second file name. For example,

```
LQ F'MYFILE','MYFILE2'
```

will send the output to MYFILE2.

K This option lets you override the default key combination used to bring up the control window and assign a new pair of keys. Use the following values:

3 Right Shift + Left Shift,
5 Right Shift + Ctrl,

9 Right Shift + Alt,
6 Left Shift + Ctrl,
10 Left Shift + Alt,
12 Ctrl + Alt,
N Disable window.

For example, LQ K12 specifies the Ctrl–Alt combination, and LQ KN disables the window.

L Sets the number of lines printed on a standard 11″ page. The default is 66; LQ L70 changes this number to 70. The number entered must be from 1 to 95. Spacing between lines is microadjusted using the smallest line advance supported by your printer ($^1/_{216}$″ or $^1/_{144}$″).

M Sets one or more of the following modes:

E Emphasized printing,
L Large (triple-high) printing,
N Narrow (elite) printing,
P Proportional spacing,
W Double-wide printing.

For example, LQ MEP could be used to turn on emphasized proportional printing. Modes omitted default to the opposite state.

Q Suppresses the display of LQ's "welcome" screen and begins execution immediately. This option is useful in batch files. For example, the commands

```
LQ F'MYFILE' C1'SANSSER' Q
LQ F'YOURFILE' C1'HELV' Q
```

could be executed without the need for an operator to press a key to continue.

R The command

```
LQ R
```

removes LQ from RAM and returns the memory previously used to your system. This option can be used only if LQ was the last memory-resident utility loaded.

S Sets the space per line in units of the smallest possible line advance. For example, on an Epson (which advances in multiples of $^1/_{216}$″), the command LQ S30 would set the distance between the tops of successive lines to $^{30}/_{216}$″. The L parameter generally offers an easier way of accomplishing the same objective.

W Wait at page breaks. Use this option for printing with single-sheet paper. Each time the form feed character (ASCII code 12) is encountered in a printout you will be prompted to

```
Press Enter for next page:
```

(In the file mode, you also can press Esc to abort the printout.)

Specify printer number (0, 1, or 2) to be used by LQ. If you have just one printer don't use this parameter; the proper value (0) is set by default.

Tips for better printouts

LQ obtains its high-quality print by making three passes over each line, placing dots at precise positions. Any play in the paper can disrupt this precision and blur a line of print. You should make the alignment precise by using friction feed for single-sheet printing, or by making certain that there is uniform tension on the paper when using tractor-feed paper for longer printouts.

As previously mentioned, the first line of print is something of a special case. When your printer is first turned on, there is apt to be insufficient tension on the paper to obtain the needed precision on the first line. This problem is solved by advancing the paper a negligible distance. This adjustment is done automatically when you use the F option for printing files or when LQ is loaded in the resident mode (if the printer's power is on). In other cases, you can use the control window to advance the paper by pressing the A key. You also can begin a document with a blank line or with Esc, Esc, B.

Proportional spacing can improve the appearance of a document, but this mode must be used with caution. Because extra white space between characters is removed and the amount of such space varies considerably (e.g., compare the characters "i" and "w"), tables of data can be distorted. For example, if the two lines

```
iiii  xxxx
wwww  yyyy
```

were printed with proportional spacing, the "yyyy" would be further left than "xxxx." One way to avoid this problem is to turn proportional spacing off (with ESC, ESC, Q) just before the table and turn it back on (ESC, ESC, P) at the end of the table. With PC-Write you can use an align font to preserve column alignment with proportional spacing. See the file LQPCWRIT.DOC for details.

Most LQ modes are enhancements of familiar print styles, so your word processor should not require special consideration. However, triple-high characters definitely will come as a surprise to any program that thinks it is counting 1/6″ lines; you will use up a sheet of paper three times faster than your word processor expects. You can change the number of lines per page in your word processor or take charge yourself in other ways. One compromise has been made to keep margins consistent: if the string

```
'      This is a test.'
```

(seven spaces preceding the word "This") is printed in large character mode, the leading spaces are printed as normal characters. This feature

lets you set the margin to a fixed value in your word processor, rather than worrying about whether the margin is in terms of large or regular spaces.

Character sets available in LQ

To see a list of all character sets on the LQ disk, type `DIR *.SET`. To obtain a printed copy of all character sets type `PRINSETS`.

The default sets installed in LQ are

1 COURIER.SET
2 COURITAL.SET
3 HELV.SET
4 PALATINO.SET

The second set is an italicized version of the first and will be used automatically when you tell your word processor to use italics. The other such pairs of sets are

HELV.SET	HELVITAL.SET
MAIN.SET	MAINITAL.SET
ROMAN.SET	ROMANITA.SET
SANSSER.SET	SANSITAL.SET
SANSSER2.SET	SANS2ITA.SET

Other sets currently included do not have italicized companions.

You can change the fonts that are loaded automatically as part of LQ with the LQINST program. You also can create or change fonts with the EDCHAR program.

Editing character sets: the EDCHAR program

Sooner or later you will probably want to modify one of the character sets provided with LQ or make a new set from scratch. For example, you might need a couple of special technical symbols occasionally, or you might fall in love with an altogether new font. The EDCHAR program included on the LQ disk offers a convenient way to edit characters in the format expected by LQ. The basic sequence is to run the program, specify the character set you want to edit (which can be an existing set or a new one), edit one or more characters corresponding to the ASCII codes 32 to 127, then save the revised (or created) set. EDCHAR also lets you easily move characters from one set to another.

To get started, simply insert the LQ disk and type EDCHAR. If you want to edit an existing set, you will want to load it now; if you are creating a new set, you can skip this step. Press L to get the following Load submenu:

1. `Load main character set.`
2. `Load auxiliary character set.`
3. `Return to Character Editor.`

If you choose one of the first two options, you are shown a list of all the character sets in the current directory. You also are given a chance to select a set or to change the directory from which you will select a set. For example, if you enter \MYDIR\, the path will be changed to the indicated directory and all character sets (files ending in .SET) in this new directory will be listed. Similarly, if the font you want is in the main directory of drive B you would simply enter B:.

You can browse through all your directories in this fashion, and when you find the one containing the set you want to use, just type the set's name. The set will be loaded into memory as the main or auxiliary set depending on your previous main selection. The main difference between these two categories is that the main set can be altered but the auxiliary set cannot. The only reason to use an auxiliary set at all is to transfer characters to the main set.

After you have loaded a main and/or auxiliary character set, you are ready to edit a character. Press G to obtain the Get submenu:

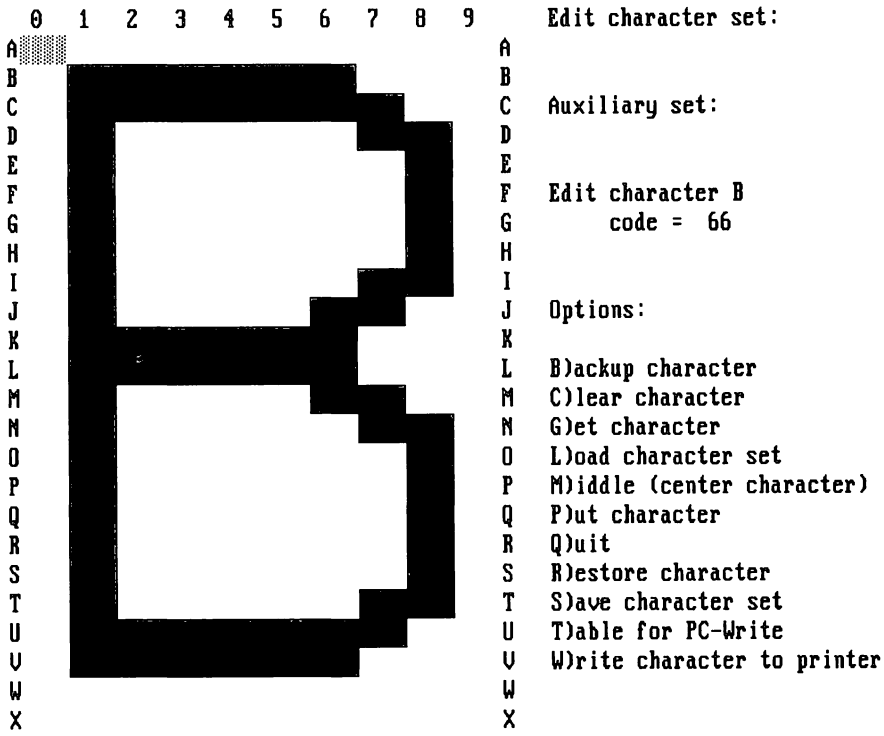
1. Get character from current set.
2. Get character from auxiliary set.
3. Edit new character.
4. Return to Character Editor.

If you choose one of options 1 through 3, you will be prompted to enter the ASCII code of the character or the character itself (preceded by a single quote). For example, you can specify the letter A by entering the code 65 or by entering 'A.

If you selected option 1 or 2, you will see the existing character from the appropriate set ready for editing. If you chose option 3, you will see a clear edit window. (See FIG. 6-5 for a typical display.) A character is edited as a 24 × 10 matrix of dots, each of which is turned on or off. You can use the arrow keys along with the Home, End, PgUp, and PgDn keys to position the cursor. Pressing the space bar toggles the state of the dot under the cursor. At any time, you also can select any of the menu options listed on the right of the screen.

When the character has been edited to your satisfaction, you can put it into the main character set with the P (Put) option. You will be given a chance to change the code under which the character will be stored, but more than likely you will use the default, the code you used with the G (Get) command.

There are three levels of storage used in EDCHAR. The ultimate (and only safe) storage site is your disk. Only complete sets, not individual characters, are saved as files on disk. There also are the main and/or auxiliary character sets in your computer's volatile memory. (Since the power might flicker at any time, you should back up the set you are editing on a regular basis. Finally, there is the individual character being edited. Modifying this character affects neither the set in memory nor the set on disk.



6-5 Font characters can be edited with EDCHAR.

Only when you Put the character to a set is the set in memory changed, and only when you Save the set in memory is the set on the disk changed.

When editing a character, you have at your disposal the following options:

B)ackup character Pressing B makes a copy in memory of the character definition currently displayed.

C)lear character Pressing C blanks the character matrix, but doesn't affect the corresponding character in the set being edited (remember, only the Put command does).

G)et character The first step in editing a character. You are shown the following menu:

1. Get character from current set.
2. Get character from auxiliary set.
3. Edit new character.
4. Return to Character Editor.

In order to get a character from a set (options 1 and 2) you must first Load the set.

M)iddle Lets you center a single character or an entire set. You are shown the following menu:

1. `Center character.`
2. `Center entire set.`
3. `Return to Character Editor.`

Selecting the first option centers the character definition on the screen, while choosing the second centers all of the character definitions in the main character set. If characters are not centered, then spacing within words can appear irregular. It is always a good idea to center the entire set when you are finished editing it.

P)ut character Replaces the corresponding character in the main set with that shown on the screen. If you don't press p, your editing will not change the character set. You are asked whether the character on the screen should be saved under the code with which it was loaded or under a different code. For example, you could load a P, modify it a little, then save it as the character R.

Q)uit Prompts you to make certain you're serious, then returns to DOS.

R)estore character Is the reverse of backup. The last character definition backed up with the B option replaces the one being displayed. Backup and Restore let you experiment with a character definition without altering a set on disk.

S)ave character set Pressing S lets you save the set being edited under the name used for loading the set, or under any other name. You are prompted to enter the name of the set or the path for saving. You can overwrite the previous version simply by pressing return, or you can create a separate second version by changing the path or set name. You will want to use the Save option often because it provides cheap insurance against power fluctuation and other perils to your data.

T)able for PC-Write Allows you to create a width table for proportional spacing in PC-Write.

W)rite character Lets you see how your character looks on paper, if you have an Epson-compatible printer attached. You will be prompted to turn on your printer, then the character being displayed will be printed in LQ mode. (LQ should not be installed in memory if you use this option.) Note that while LQ works with printers that are not Epson-compatible (through the use of PAR configuration files), EDCHAR does not. If you want to see your new characters on paper, you might have to wait until you exit EDCHAR and run LQ.

Tips on editing character sets

Make certain that you use the same base lines for all the characters in a given set, so the characters will line up properly when printed. The follow-

ing should be aligned:

- The base of characters without descenders
- The top of lowercase letters, such as *a* and *c*
- The top of uppercase letters.

If you want to create a new font, you might want to work from an existing font. For example, you might reuse the punctuation symbols but change the letters and numbers. To do this, copy (at the DOS prompt) the set to be edited to a new name:

```
A> COPY OLD.SET NEW.SET
```

Now, you can run EDCHAR and edit the new set without risking your old set. The same thing can be accomplished from within EDCHAR by loading a set, editing it, then saving it to a different name; however, you must be sure to enter the new name or your old set will be lost.

Additional programs

There are a few additional programs and files on the LQ disk which can enhance your use of the package. Included are LETHEAD.COM, LETHEAD.DOC, BIGPRINT.COM, PRINTBIN.EXE and LQPCWRIT.DOC. Following is a description of each:

LETHEAD (the LQ letterhead editor) LETHEAD is a graphics editor that works in conjunction with LQ to produce high-resolution letterheads consisting of 1″ × 1″ pictures and up to four lines of accompanying text. Each picture (23,040 dot positions) is stored in the format of an LQ character set, although the picture segments don't look like characters. LETHEAD lets you

- Edit a picture
- Save a picture
- Load a picture
- Create a data file to be printed, with the picture serving as one of LQ's character sets (the letterhead). The final product can be printed with a one line batch file.

The basic idea behind printing pictures is that all LQ characters are arbitrary graphics shapes anyway, so a block of them can be combined to make a larger image. The only problem is the space that normally is inserted between characters and between lines. By preceding a sequence of characters with the control code Esc, Esc, C, no space will be inserted. Esc, Esc, D returns LQ to the usual mode. If the graphics mode is active at the end of a line, then the next line will start exactly where the last line left off regardless of the current line space setting. LETHEAD automatically inserts the proper control sequences when you use it to create a letterhead. Typing LQDEMO will produce a printout that includes a spiral pat-

tern. Look at the file DEMODATA.1 to see the data that produces this picture.

For complete instructions on using LETHEAD, you will need to print the file LETHEAD.DOC from the LQ disk by typing

```
PRINTMAN LETHEAD.DOC.
```

BIGPRINT (a banner printer) BIGPRINT.COM is a program that will let you print banners in any LQ font. After you type BIGPRINT, you will be prompted:

```
This program lets you print posters using any of the LQ
character sets.
Name of character set? (Default = ROMAN.SET)
```

Enter the name of the LQ font you wish to use, or just press Enter to accept the default font, Roman. Next you are asked

```
Is your printer Epson-compatible?
```

Type `Y` or `N` as appropriate, then press Enter. Finally, you are asked to

```
Enter string:
```

At this point, enter the text you wish to print. The string will be printed lengthwise on your paper with characters about 5″ high (centered on 8.5″ wide paper).

Registration

You can obtain the current LQ disk from Granny's Old-Fashioned Software for $10, or a registered package for $35. Registration provides the following benefits:

- A current version of LQ including printed manual
- A mail-in card for a future version of LQ
- A $10 commission each time someone registers from one of your copies
- Telephone support for your technical questions

To register, phone (704) 264-6906 or write to

Granny's Old-Fashioned Software
Rt 4, Box 216
Boone, NC 28607

DISK SPOOL II (Disk 609)

Special requirements None.

DISK SPOOL II is a program that fundamentally changes the manner in which printing takes place on your computer. Without DISK SPOOL II,

whenever an application prints information, it sends it directly to the printer. If you don't have a printer attached to your computer, then you can't run the application. If your printer halts for whatever reason, then the application halts, too. More importantly, your application's execution speed is held back by the printer, regardless of how fast your computer is or how well designed the application is.

With DISK SPOOL II, your applications do not have to contend directly with the printer, because DISK SPOOL II sits in the background and intercepts your printer data, rerouting it to a disk file. Two benefits are immediately derived from this spooling. Disk files never jam and don't have ribbons to wear out, so you know your application will run to completion. Secondly, even the fastest printers cannot process data as quickly as a disk drive. So, your applications finish sooner, and you are able to do more work in less time.

What good is the data out in a disk file? Here is where the second main part of DISK SPOOL II comes into play. With your data safely out on disk and you busy performing other tasks on your computer, DISK SPOOL II works behind the scenes to send the data from the disk file to the printer. How is it possible for the computer to be doing two things at the same time? The answer is that your computer has a generous supply of excess processing cycles on its hands, and DISK SPOOL II merely puts these cycles to work. The computer isn't really doing two things at once, it just looks like it is.

You might be asking yourself why the concepts described above have not been made part of your computer's operating system by the manufacturers, because the time savings apparently is so dramatic and so universal. The answer is that personal computers are following the same evolutionary path that mainframes did several decades ago. Just like mainframes, the first operating system (and the one we are still using today) was not designed to be able to handle multitasking easily. It is a sure thing that the new operating systems being developed for the PC, just like the second generation of mainframes, will have spooling environment capabilities built in. In the meantime, DISK SPOOL II enables you to tap into this kind of operating power right now on your present PC.

There are four versions of DISK SPOOL II: SP2.COM, SP2S.COM, SP2SS.COM, and SP2SSS.COM. Each version contains fewer features, but also requires less memory to run. The documentation that follows describes the full-featured version, SP2.COM.

Using DISK SPOOL II

Getting DISK SPOOL II to start working for you is as simple as keying in the program name, SP2, and pressing the Enter key. DISK SPOOL II has been preconfigured, so it will spool data to a file called SPO.SPL in the root directory of drive C: and will print to port LPT1. If you want the spool file to

reside on a different drive, you could go into the configuration program (SP2CFG) and make a change. For now, the easiest way is to just key in a drive letter. For example, type:

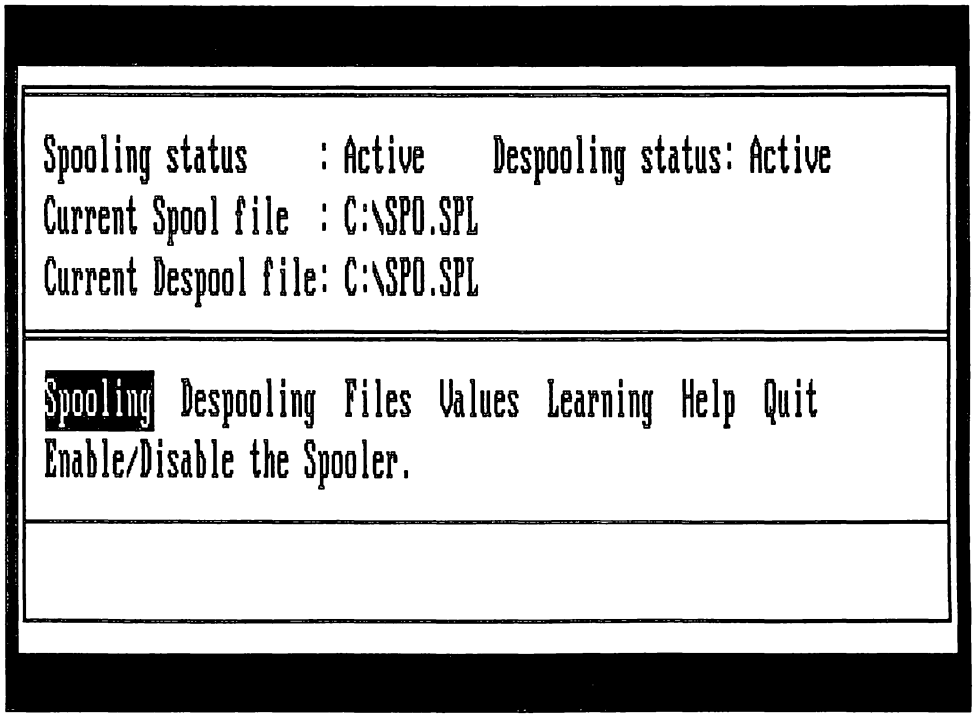
```
SP2 D
```

If your printer is attached to a COM port, again, you could go into SP2CFG, but to keep things simple for now, just key in a K. For example:

```
SP2 DK
```

overrides the default drive and port.

If you want to experiment with the pop-up menu, hit the Alt and Left Shift keys simultaneously. The menu shown in FIG. 6-6 is straightforward. There also is context-sensitive help text available at every tier, so you should be able to get into the swing of things quite quickly.

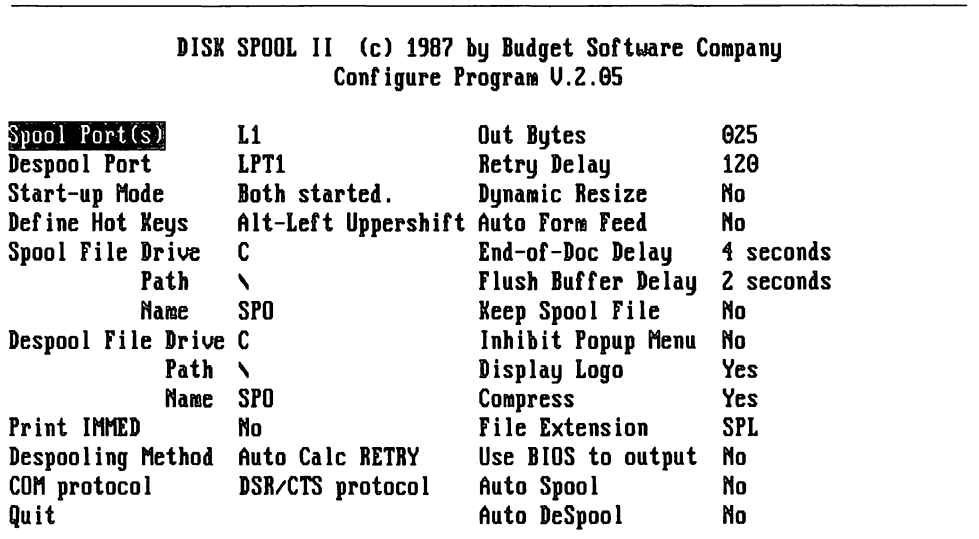


6-6 When you press the hotkey, the Disk Spool II menu pops up.

There is only one thing that some people will have to do differently than before. If you want to print a DOS file, don't use the PRINT command supplied with DOS and don't do a COPY *filespec* LPT1, TYPE *filespec* > PRN, or the like. Rather, use the SP2PRT command supplied along with DISK SPOOL II. Simply key SP2PRT followed by the filename. The SP2PRT command is many times faster than its DOS counterparts and also works fine even if DISK SPOOL II is not loaded.

Configuring DISK SPOOL II

DISK SPOOL II comes with a program called SP2CFG, which is used to configure DISK SPOOL II. Note that any settings made do not take effect until the next time DISK SPOOL II is initiated into memory. This program is easy to use. The SP2CFG menu is shown in FIG. 6-7. You merely highlight a configuration item using the arrow keys and press Enter to change the value. This program also is a good tool for learning about DISK SPOOL II, because each configuration item is described in detail at the bottom of the display.



```
DISK SPOOL II  (c) 1987 by Budget Software Company
Configure Program V.2.05

Spool Port(s)      L1              Out Bytes          025
Despool Port       LPT1            Retry Delay        120
Start-up Mode      Both started.   Dynamic Resize     No
Define Hot Keys    Alt-Left Uppershift Auto Form Feed  No
Spool File Drive   C               End-of-Doc Delay   4 seconds
          Path     \               Flush Buffer Delay 2 seconds
          Name     SPO             Keep Spool File    No
Despool File Drive C               Inhibit Popup Menu No
            Path   \               Display Logo       Yes
            Name   SPO             Compress           Yes
Print IMMED        No              File Extension     SPL
Despooling Method  Auto Calc RETRY Use BIOS to output  No
COM protocol       DSR/CTS protocol Auto Spool         No
Quit                               Auto DeSpool       No

These are the ports that DISK SPOOL II will spool. Data sent to any of these
ports will be intercepted, and redirected to the current Spool File.  Possible
values are: LPT1, LPT2, COM1, COM2, COM1 Input, and COM2 Input.  The COM1 and
COM2 Input values mean that data coming into these ports will be intercepted and
spooled.  These settings may be changed from within the hot-key menu.
```

6-7 The configuration menu.

The menu

DISK SPOOL II is a memory-resident program with functions that can be controlled by means of a pop-up menu. You can be in the middle of any application and access DISK SPOOL II's menu simply by pressing the two hotkeys. DISK SPOOL II comes preconfigured with the Alt and Left Shift keys as the hotkeys. However, you can configure any key combination that you desire.

The menu is in the popular Lotus "single-tier" style. The top row of the menu displays several keywords, each representing a menu selection. You select a menu option either by positioning the menu bar over your

selection or by tapping the first letter of the keyword. The second row of the menu gives a short description of the menu option currently being highlighted by the menu bar. Often, a menu selection leads to another menu tier. You can back up a tier by pressing the Esc key. As you become familiar with DISK SPOOL II, you will quickly learn the letter sequences needed to perform a desired function.

The spooler and the despooler

Before describing in detail all of the various features of DISK SPOOL II, a short introduction of its two main components is in order.

The spooler's job is to intercept printer data and redirect it to a disk file. The despooler's job is to work in the background sending the contents of the file to the printer. With the pop-up menu, you have the ability to enable and/or disable both components. When the spooler is enabled, it does its job of spooling printer data out to disk. When disabled, printer output goes directly to the printer, just as if DISK SPOOL II were not in memory at all. When the despooler is enabled, it is busy sending the contents of a disk file out to the printer. When it is disabled, no such background printing takes place. Having the ability to control when printer output actually gets printed is one of the most attractive features of DISK SPOOL II.

One of the attributes of the spooler is which port or ports it is intercepting. Most computer applications are designed to send printer output to LPT1; therefore, DISK SPOOL II comes preconfigured to intercept only printer output that is being sent to LPT1. However, DISK SPOOL II can be configured to intercept output being sent to any of the four standard ports: LPT1, LPT2, COM1, and COM2. You can specify any multiple combination of the four. You also can change your settings on the fly from within the pop-up menu.

An additional powerful feature of DISK SPOOL II is the ability to spool data being sent to your computer from an external source. This function takes place in the background, and it doesn't interfere with any spooling/despooling activities that are taking place. If you enable this function (by designating that the spooler is to spool COM1I or COM2I), then any data sent from the outside to COM1 and/or COM2 is stored in files MONCOM1 and MONCOM2, respectively.

An attribute of the despooler is selecting the port where it is to send data. DISK SPOOL II gives you complete control over which port receives the spooled data.

Modes of operation

There are three basic modes of operation with DISK SPOOL II described in the following sections.

Manual mode In manual mode, data is spooled to a single file, unless you manually designate a different file. Similarly, data is despooled from a single file, unless you manually designate a different file.

The spool file. DISK SPOOL II comes preconfigured so, when it is first loaded into memory, it will look for a file called SPO.SPL in the root directory on drive C:. If it does not find such a file, then it creates one. It then "attaches" the spooler and the despooler to this file. Spooled data will go to that file, and the despooler will print the contents of that file. You can configure DISK SPOOL II to use any file, directory, or disk drive you wish. You even can specify different files for the spooler and the despooler. These designations can be changed on the fly using the pop-up menu.

One interesting setting is to leave the drive and the path designations blank. Then, as you change directories and data is spooled, DISK SPOOL II will create a new spool file in the current directory. In this manner, all your spreadsheet printouts could be found in one directory, all your word processing printouts in another, and so forth.

When the spool file is empty, it only takes up 33 bytes on your disk or diskette. It grows as data is spooled into it.

There are three ways that data is purged from the spool file:

- Clearing it manually. If the file you wish to clear is the one currently attached to the spooler, then you can perform the Files Clear Spooler menu sequence (press F, C, S). Similarly, if the file is currently attached to the despooler, then the Files Clear Despooler sequence does the job. Also, if you perform the Files List menu sequence, you are presented with a display of files. You can delete any one of them by keying a 9 in the option field. (*Note*: you also can delete the file by using DOS's DEL or ERASE commands. Don't worry about deleting the current spool file, since DISK SPOOL II will recreate the file automatically if it needs to.)
- When DISK SPOOL II is initiated into memory. DISK SPOOL II can be configured so, when it is initiated into memory, it checks the spool file to see if it has been printed out completely. If the file has been printed, the program clears it. DISK SPOOL II is preconfigured with this option. If you would rather keep spooled data on a disk and purge it manually, then change the configuration option "Keep Spool File" to YES.
- Resizing the file dynamically. If you anticipate running low on disk space (perhaps because you are going to do quite a bit of printing between reboots) and you don't want to have to concern yourself with manually clearing or deleting files, then you should configure DISK SPOOL II's "Dynamic Resize" option to YES. With this setting, every time the despooler reaches the end of a file, it deletes it off of the disk.

Controlling the despooler. You can control when printing will take place by enabling or disabling the despooler. You can tell the despooler to begin printing at the beginning of the file, or you can tell it to begin after the last fully-printed document. The latter method is handy if your printer jams. By starting the despooler after the last fully-printed document, you pick up at just the right place.

Printing also can begin at the end of the file. This method of enabling the despooler means that despooling will start at the exact point where it left off. If you suspended printing by disabling the despooler and want to start back exactly where you left off, then use this method.

You also can use the P option from within the file display. You can start despooling at any place within the spool file by displaying the file (using the File Display Despooler menu sequence), positioning the starting line at the top of the display, and pressing the P key. The best method to use here is to disable the despooler, perform the above steps, and then enable the despooler after the last fully printed document.

Printing from different files. You can attach the despooler to any spooled file in either of two ways.

- Use the File Attach Despooler menu sequence and then key in the filename.
- Use the Files List menu sequence and key a 3 next to the file you want to print.

Don't try to attach the despooler to a file other than one that was spooled. If you want to print another file, simply key in `SP2PRT [filespec]`. In this manner, the file will be spooled. This command operates quickly, as all it does is append the file to the end of the spool file.

Controlling the output port. You designate a default output port in configuration. You can change this value by keying the menu sequence Values Despoolport and using the cursor movement keys to make a selection.

Auto-spool Another mode of operation is auto-spool. In auto-spool mode, a new spool file is created for each document spooled. To display a list of the files created, key the Files List menu sequence. Note how this list shows you the filename, the time and date it was created, its size, and the name of the program that printed the document. To print a file, key a 3 next to its name. The number attaches the despooler to that file.

You can enable auto-spool in two ways: through configuration or from within the pop-up menu by using the menu sequence Spooling Auto-spool Enable. You can disable auto-spool from within the pop-up menu, as well.

By default, each file created by the autospooler will have the following attributes:

Copies	1
Despool port	The despool port as seen in the Values Despoolport menu sequence.

Save status	If the dynamic resize parameter as designated in the configuration program is sent to YES, then the file will be deleted after printing. Otherwise, it will be saved.
Hold status	No
Description	The name of the program that printed the document.

All of these values can be changed from within the Files List display. Take option 5 for the file you wish to change. Select option 4 to place a file on hold.

Note: the hold status is really only meaningful when operating in auto despool mode. See the following description of this mode for more details.

You can set up DISK SPOOL II so different applications result in different spool file attributes. For instance, you might want all your graphics applications to go to COM1 and be printed twice, while your spreadsheet printouts go to LPT1 and are saved.

To tailor DISK SPOOL II in this manner, simply use your text editor to modify the SP2.DAT file. For example, the line:

```
123 COPIES:1 PORT:LPT1 SAVE:YES HOLD:YES
```

would cause any documents printed by application 123 to take on the print attributes as shown.

Auto despool The third mode of operation is auto despool. In auto despool mode, not only are separate files created for each document, but the despooler automatically attaches itself from one file to the next, as files become available for printing.

You can enable auto despool in two ways: through configuration or from within the pop-up menu using the menu sequence Despooling Auto-despool Enable. You can disable auto despool from within the pop-up menu, as well. Because auto despooling goes hand-in-hand with auto spooling, whenever you enable auto despool, DISK SPOOL II automatically enables auto spool, as well.

The effect of enabling and disabling the despooler is the same, whether it is in auto mode or not. While the despooler is enabled, you can prevent a file from being printed by placing it on hold by keying a 4 next to the filename from within the FIles List display. (This display is the one that first pops up when you are in auto despool mode.) You can release a file for printing by keying a 6 next to the filename.

Spooler speed

One of the most attractive features of spooling is that control is returned to you more quickly than when printing goes directly to the printer. The quickness of the spooling function can be controlled in three ways.

The buffer size As printing is taking place, DISK SPOOL II buffers characters in memory and flushes them to disk when the buffer becomes close to being full. You can achieve substantial performance increases in this area (up to 100% faster) by increasing the size of the internal buffer. The buffer size is measured by using a command-line parameter when you first initiate DISK SPOOL II into memory. The parameter is an `M` followed immediately (no spaces) by a digit from 0 to 9.

Each of the four versions of DISK SPOOL II takes up a certain amount of base memory (the amount of memory required to perform its functions). The largest size that the spool buffer can be is 64K less this amount of base memory. When you utilize the `M` command-line parameter, DISK SPOOL II divides the available buffer area by 10. The digit following the `M` specifies how many of these divisions will be used. If you keyed in `SP2 M9`, then the entire available area is allocated for the spool buffer.

Using a RAM disk When you spool to a file on a RAM drive, the spooler performance increases by a factor of approximately 100%.

Using SP2PRT If you have a file that you simply want to send to the printer, send it by using the SP2PRT command. Key `SP2PRT` followed by the name of the file you want to print. Using SP2PRT results in spooler performance that is three times faster.

Despooler speed

DISK SPOOL II has been designed to take advantage of every free processing cycle for printing. Therefore, you should be experiencing no printing speed degradation whatsoever. However, if your foreground process is processor intensive (a program is running that requires little user interface) and your printing speed is not satisfactory, you might experience a significant performance increase by fine-tuning.

The first thing to try in the fine-tuning process is setting the despool method configuration option to "Hardware Interrupts." If you are printing to a COM port, then "Hardware Interrupts" will give you just about as efficient a printing speed as is possible. With LPT ports, however, due to a flaw in the design of many of the LPT cards on the market today, "Hardware Interrupts" won't work at all and will result in extremely slow printing speed. If you have such an LPT card, then Budget Software Company can provide you with an adapter that corrects the problem. The cost is $15.

You can create your own adapter if you want. You need a female DB-25 connector for the printer side and a male DB-25 connector for the computer side. Simply connect all wires straight through, except leave pin 10 on the printer end disconnected and connect pins 10 and 11 on the computer side to each other.

If "Hardware Interrupts" won't work for you, then a certain amount of

performance increase can be obtained by following these fine-tuning steps:

1. Configure DISK SPOOL II to the manual despool method and set OUTBYTES to 32 and RETRY to 1.
2. Disable the despooler, and spool out a large document, one that will take several minutes to printout.
3. Enable the despooler and wait about 30 seconds to fill up the buffer on your printing device.
4. Use the pop-up menu sequence Learning Timingtests Enable Toggle Open. A window should open at the bottom right corner of your display. The heading should be "Bytes printed/second."
5. While the despooler is still printing, key the pop-up menu sequence Values Retry. Now, press your up arrow and observe how the bytes printed/second value changes as the RETRY value is increased. At a certain point, the bytes printed/second will make a dramatic increase. You have found the threshold value for RETRY. Add about 5 or 10 to this value and use this value.

You now can play with the OUTBYTES value in a similar fashion. You won't notice a threshold situation. Instead, your bytes printed/second will increase gradually as OUTBYTES increases. The rule here is to set OUTBYTES sufficiently high to obtain maximum printer speed, but not so high that you notice foreground degradation.

Versions of DISK SPOOL II

There are four versions of DISK SPOOL II on your diskette. Each version takes up less memory, but has fewer features.

SP2 — Fully-functioning version. Takes up about 51K.

SP2S — The timing test feature has been dropped, as well as the ability to spool data coming to your COM port from an external source. Uses approximately 45K.

SP2SS — The Files List function has been dropped, and you don't have the ability to display the contents of a file from within the pop-up menu. Also, auto spool and auto despool aren't available. Takes up 25K.

SP2SSS — No pop-up menu. It takes about 14K. Note that even without the pop-up menu, this version gives you a substantial amount of control over your spooling activities. You merely hold down the hotkeys and then press one of the following letters:

E Enable spooler
D Disable the spooler

S Suspend despooling
R Resume despooling where you left off
B Start the despooler back up at the beginning of the spool file.

Note also that you can control SP2SSS (as well as the other modules) by means of keying in the program name followed by one or more command-line parameters. Several command-line parameters work both as load-time parameters as well as run-time. For example, if you want to clear the current spool file, you can key `SP2 X`.

Command-line parameters

Several DISK SPOOL II functions can be controlled by means of command-line parameters. These parameters are keyed after keying SP2. They can be keyed in any order, and uppercase or lowercase is allowed. A detailed discussion of each command line parameter is given below.

The following parameters are functional only when DISK SPOOL II is first initiated into memory:

`L` Expand the spooler buffer to the largest possible value that fits in 64K. This size has the benefit of quicker spooling times, and hence your application returns control to you more quickly. The price you have to pay for this performance is that more of your computer's memory is taken up by DISK SPOOL II.

`M` Follow this parameter by a digit from 0 to 9. In this manner, you can select various gradations for increasing the size of the spooler buffer.

`!` This command-line parameter is always followed immediately by a 1 or a 2, and then by a character 1 through 9 (e.g., !16 or !29). What this parameter does is establish a larger buffer for the COM monitoring function, the ability to spool data being sent to your COM port from an external source. The 1 or 2 designates which COM port, and the next digit designates a buffer size in 1K increments.

The following parameter does something only when DISK SPOOL II is already in memory:

`T` Takes DISK SPOOL II out of memory. Note that when you take DISK SPOOL II out of memory, any memory-resident programs loaded after DISK SPOOL II was loaded also are removed.

The following parameters are functional if DISK SPOOL II is being initiated into memory for the first time or is already in memory.

`K`*n* Spool and despool using a COM port, where *n* represents the COM port number: 1 for COM1, and 2 for COM2.

- `Pn` Spool and despool using an LPT port where *n* represents the LPT port number: 1 for LPT1, and 2 for LPT2.
- `#` Disable the spooler and the despooler.
- `$` Enable the spooler and the despooler.
- `%` Enable the spooler (*Note*: if you include this command-line parameter with a .BAT file, you must put two percent signs back to back, otherwise DOS thinks it's dealing with a substitution variable.
- `&` Enable the despooler.
- `*` Disable the despooler.
- `+` Disable the spooler.
- `X` Clear the default spool file.
- *d* Place the spool file on this drive, where *d* represents any drive letter from A to J.
- `R` Enable the "dynamic resize" (when the despooler reaches the end of the file, it deletes the file).
- `=` This parameter is always followed by 1, 2, 3, or 4. For example:

```
sp2 =3
```

This last parameter is used to load and maintain multiple copies of DISK SPOOL II in memory. Generally, if you just key in `SP2` followed by one or more command-line parameters, DISK SPOOL II merely reconfigures the version that is presently in memory. If you want to initiate a subsequent version, then you do so by including the = parameter. For example:

```
SP2 P1
```

initiates DISK SPOOL II into memory and spools/despools LPT1.

```
SP2 =2P2
```

initiates another copy of DISK SPOOL II, this time spooling LPT2.

```
SP2 =1K1
```

reconfigures the version loaded first to spool/despool COM1. For a more detailed discussion of using multiple copies of DISK SPOOL II in memory at the same time, refer to the next section.

Loading multiple copies into memory

You can have multiple copies of DISK SPOOL II in memory at the same time. In this way, you can have more than one printer working simultaneously and still be working at your computer.

There are several things to consider when loading multiple copies of

DISK SPOOL II into memory. If you are going to want to utilize the pop-up menu, then you are going to want to configure different versions, each one with a different hotkey sequence. For example, you want to drive the LPT1 and the LPT2 ports simultaneously. You would go into SP2CFG and configure one of the SP2 versions to despool to LPT1, and you would define a certain hotkey sequence. You also would want to configure a unique default spool file and despool file. Then, you would make a copy of this program, possibly calling it SP2L1.COM. You would do the same thing to create an SP2L2.COM. The first version would be loaded by simply keying in the name of the program. To load a second version, you need to include the =2 command line parameter: SP2L2 =2.

Note: It is not sufficient to simply load up differently named programs. You indicate a separate version by keying the =2, =3, or =4 on the command line. You also can use an =1 parameter; however, if you don't specify an = parameter, it is the same thing as an =1.

Under this scenario, you would tap the one hotkey sequence to bring up one program's pop-up menu, and would tap the other hotkey sequence to bring up the other. Note that if you want to use the command line to make changes to a version that is already in memory, then you must use the = parameter to designate which one you are changing. For example, if you wanted to clear the spool file of the program loaded second using the command line, then you would key in SP2L2 =2X.

Redirecting output

You can redirect the despooler's output to a device driver or disk file. Key in SP2 *@xxxxxxxx*, where *xxxxxxxx* represents the name of the device driver or the disk file (eight characters maximum, including an optional drive and path designation). You might want to redirect the despooler output to a disk file to use it with an application. DISK SPOOL II can be configured to utilize a compress algorithm to minimize the disk usage. (DISK SPOOL II comes pre-configured to use this algorithm.) However, with a compressed file, you can't port the file directly into an application program. If you redirect the despooler output to a disk file, then this file will be an exact image of the printed document.

If you redirect to a disk file and the file already exists, then the data is added to it. To cancel redirection and revert back to normal processing, key in SP2 @ with nothing following the @ sign.

Printing multiple copies to a file

You can designate for multiple copies to be printed of a file. Go into Files List and use the option to change the file. If you still want more copies, then simply disable and re-enable the despooler. If auto despool is enabled, then just release the file. Note that DISK SPOOL II will not page-

feed between copies unless you tell it to do so by configuring the auto form feed option in SP2CFG. Often, this option is not necessary, because the application you are running usually will send the necessary form feed instructions.

Customizing the help system

You can tailor the context-sensitive help file (SP2.HLP) to include your own helpful hints and information. Simply go into your text editor, locate the menu tier, and add or change text to suit your needs. DISK SPOOL II uses the first letters of the menu keying sequence, followed by a special control character, to find the appropriate help text. Therefore, the only thing that you have to worry about is not changing these control lines.

Removing DISK SPOOL II from memory

DISK SPOOL II can be taken out of memory completely by typing

```
SP2 T
```

However, any memory-resident applications that have been loaded after DISK SPOOL II are taken out, too.

Registration

A registration fee of $44 should be sent to

Budget Software Company
P.O. Box 12282
12162 E. Mississippi Avenue
Aurora, CO 80012
(303) 695-9095
CompuServe: 70033,643

On-Side (Disk 1184)

Special requirements Your printer must be compatible with the Epson/IBM graphics standard.

Have you ever finished preparing a perfect-looking spreadsheet or report only to find that, when you print it, it is too wide to fit on the paper? First, you jam the columns closer together. You consider using wider paper, but you don't have any around or your printer doesn't take it. Finally, in desperation, you use your printer's tiny compressed print font or print the report on two pages and tape them together. Either way, the result is definitely not what you had intended.

With On-Side, your printer can print the report sideways, so a wide report can be printed the long way on a sheet of paper even if your printer

can't take wide paper. If a report overlaps onto two or three pages, the perforations can be left connected so that a really wide report folds up nicely into letter size for filing.

For most users, sideways printing is preferable to printing in compressed mode or using big sheets of green bar computer paper that never fit into files, notebooks, and briefcases. Not only can you print wide reports sideways on narrow or wide paper, you also have a choice of several character font styles. Some might be better than the fonts your printer produces horizontally.

Use On-Side with spreadsheet reports. word processing documents, database reports, or just about any program that can write its printed output to disk can be used with On-Side. For example, you can prepare a wide report with ExpressCalc, use the /Print command to print it to disk, then run On-Side to print the report sideways. An ExpressCalc report can be printed up to 9 feet wide using On-Side.

All the font styles provided with On-Side can be enlarged or magnified to stretch themselves vertically, horizontally, or both. By magnifying the fonts in all their various sizes and shapes, you have 175 different style/size combinations to choose from.

On-Side lets you change any character's dot pattern permanently with its easy-to-use font editor screen. If you feel creative, you can make your own personalized fonts, starting from scratch or using an existing font as a starting point.

Installing On-Side

If your computer has a color monitor and a graphics board, On-Side automatically displays its screens in color. On-Side detects whether your computer has a monochrome board or a color graphics board, then uses color or black and white accordingly. Some computers, however, have a black and white monitor connected to a color board, which tricks On-Side into sending colors to the black-and-white screen. Trying to display color on a black-and-white monitor can cause characters to appear hazy and unreadable. In some cases, characters might not appear on the screen at all.

Using On-Side

The ONSIDE.EXE program is used as a command at the DOS prompt. The syntax is

ONSIDE [*filename*] [*font*] [*parameters*]

where

filename Is the name of the file you want to print. Include a directory path if necessary.

font Is the name of one of the On-Side font types.

In addition to the name of the file to be printed and the font name, the command line can contain one or more of the following commands:

/M Monochrome (black and white) display: This command is sometimes necessary when using On-Side on a monochrome graphics monitor with a color graphics board. Users with color graphics monitors also can use the command to make the screens appear in black and white.

/S Turn off the sound: On-Side makes a distinctive beep when an invalid character is entered. Some computers have louder speakers than others, and the sound might be annoying to you or to others around you. Use the /S command to turn it off.

/B Use BIOS calls for screen display: Some computers' video memory is not fully compatible with the IBM PC. To display data on the screen as quickly as possible, On-Side places data directly into video RAM. Some early models of MS-DOS computers did not map video memory at the same address as the IBM PC. On computers with video RAM at a different address, nothing gets displayed (i.e., the screen stays blank). If you specify /B on the command line, On-Side uses calls to the ROM BIOS for screen displays. Calling to BIOS makes screen displays slower, but assures that the data is displayed.

/GO Batch mode: This command tells On-Side to immediately print the file indicated on the command line. If /GO is specified, On-Side does not display any screens or prompts, but immediately starts printing. When the printing is finished, On-Side automatically ends and returns to the DOS prompt.

The following commands can be specified on the command line to override the sideways printing defaults. If /GO also is specified, these options take immediate effect and the specified file is printed. If /GO is not specified, the normal screens appear but these options appear on the screens as defaults. The equal sign is optional:

/LM=*n*	Left margin, in inches
/TM=*n*	Top margin, in inches
/LPP=*n*	Lines per page
/SP=*n*	Starting page number
/BLTR=*n*	Space between letters, in 1/72 of an inch
/BLIN=*n*	Space between lines, in 1/120 of an inch
/HM=*n*	Height magnification
/WM=*n*	Width magnification
/PW=*n*	Paper width, in inches
/PH=*n*	Paper height in inches (0 for form feeds)
/DS	Double strike

When you run ONSIDE.EXE (without the /GO parameter), the program loads into memory and, after a second or two, the banner screen appears.

If your banner screen does not appear or has some unreadable characters, you probably have a special hardware configuration that On-Side cannot detect properly. Try the /M command. The banner screen is displayed until you press a key. Then the On-Side main menu displays.

Below are some examples of the On-Side command line:

ONSIDE RPT.PRN	Prints the report named RPT.PRN
ONSIDE \MASTER\RPT.PRN	Report is in \MASTER on current drive
ONSIDE B:\MASTER\RPT.PRN	Report is in \MASTER on drive B
ONSIDE RPT.PRN BOLD	Report will be printed using BOLD font

If On-Side is started using the command line:

```
ONSIDE C:\MASTER\RPT.PRN PICA /M/S/DS /LM=1/PH0 /GO
```

the program prints the report called RPT.PRN in the \MASTER subdirectory on drive C, using the PICA font. The screen displays in monochrome with no sound. The program immediately starts printing, with no prompt screens. The report is printed in double-strike with a left margin of one inch, and a form feed is used to advance the paper. Spaces can be used before or after operands. Equal signs are optional.

On-Side can be configured to automatically use one or more of these command-line options, plus several other options, by using special configuration files called profiles.

Controlling input to On-Side

The Esc key. The Escape Key (Esc) can be used almost anywhere in On-Side to back out of a section of the program and return to the previous menu. When a screen is displayed and you want to return to the main menu, press Esc. Esc can be pressed at the main menu to exit to DOS.

Single keystroke input. When a prompt requires that only one key be pressed, the command is carried out immediately without having to press Enter. Whenever an incorrect or inappropriate key is pressed, On-Side sounds a two-tone warning and ignores the keystroke. The F10 key indicates that you have finished entering information and are ready for the next screen.

Multiple keystroke input. All questions or entries that allow more than one key to be pressed must be followed by Enter before On-Side processes the keystrokes. On any prompt or field that allows two or more characters to be entered, the following editing keys may be used:

Backspace	Erases the character to the left of the cursor.
Del	Erases the character under the cursor.
Ins	Toggles insert mode on and off. When insert mode is on, the cursor increases in size and characters are inserted

at the cursor as they are entered. The characters to the right of the cursor are shifted toward the end of the field.

Left arrow	Moves the cursor left, toward the beginning of the field. No characters are erased.
Right arrow	Moves the cursor right, toward the end of the field. No characters are erased.
Home	Moves the cursor to the first position of the field. If the cursor is already in the first position of the field, Home moves to the first field on the screen.
End	Moves the cursor to the position following the last non-blank character on the line.
Ctrl–Home	Erases the entire line and puts the cursor back at the beginning of the field.
Ctrl–End	Erases all characters from the cursor to the end of the field. The cursor does not move.
Enter	Indicates that all the data has been entered in the field. Enter can be pressed no matter where the cursor is within a field, and the entire field will be processed as input.

Characters cannot be entered past the end of a field. Any attempt to enter characters beyond the end of the field causes the computer to beep. However, all control keys (Enter, Backspace, F10, etc.) can still be used.

The alternate Ctrl keys. On-Side also supports the keyboard standard for the Ctrl keys popularized by Micropro's WordStar (sometimes referred to as the "WordStar control key standard"). Many popular software programs support this standard.

There are two important reasons why this standard is so popular. It allows touch-typists to perform all the control key functions without removing their hands from the keyboard. It also allows numeric keypad users an optional set of arrow keys, so NumLock can be left on all the time. If you are a fast typist and seldom look at the keyboard or you do a lot of keypad input, you will likely find these control keys helpful. It takes some time to get accustomed to them, but eventually they become second nature just like the other keys on the keyboard.

The Ctrl key is like a special shift key. If you hold it down and press a letter, a special character is sent to the computer. These are the Ctrl keys which On-Side supports:

Ctrl–E	same as up arrow
Ctrl–G	same as Del
Ctrl–S	same as left arrow
Ctrl–T	same as Ctrl–End
Ctrl–D	same as right arrow
Ctrl–Y	same as Ctrl–Home

Ctrl-X	same as down arrow
Ctrl-Q	same as Esc
Ctrl-F	same as Tab
Ctrl-W	same as F10
Ctrl-A	same as Shift-Tab
Ctrl-Enter	same as F10
Ctrl-V	same as Ins

Printing sideways

Printing a report sideways is a two-step process. First, the report must be written to disk. If the report is being printed by File Express or Express-Calc, just select the option to write the report to disk instead of to the printer. Most spreadsheet programs, report writers, and word processors are capable of writing reports to disk. They usually prompt for a name to call the report file. We suggest you use the extension PRN in the filename, to identify it as a print file.

After the report is written to disk, exit to DOS and run the On-Side program, following the instructions in the section, Installing On-Side. When the main menu screen displays, press 1 or P to print sideways.

There are many features in On-Side, so there are numerous options to select. When printing sideways, the three screens discussed below are each displayed, allowing you to change one or more of the options. For most sideways printing applications, none of the options need to be changed, because On-Side will default to the most commonly used choice for each option. If all the options on a screen are exactly as you want them, you can press Enter on each field or press F10 to immediately advance to the next screen.

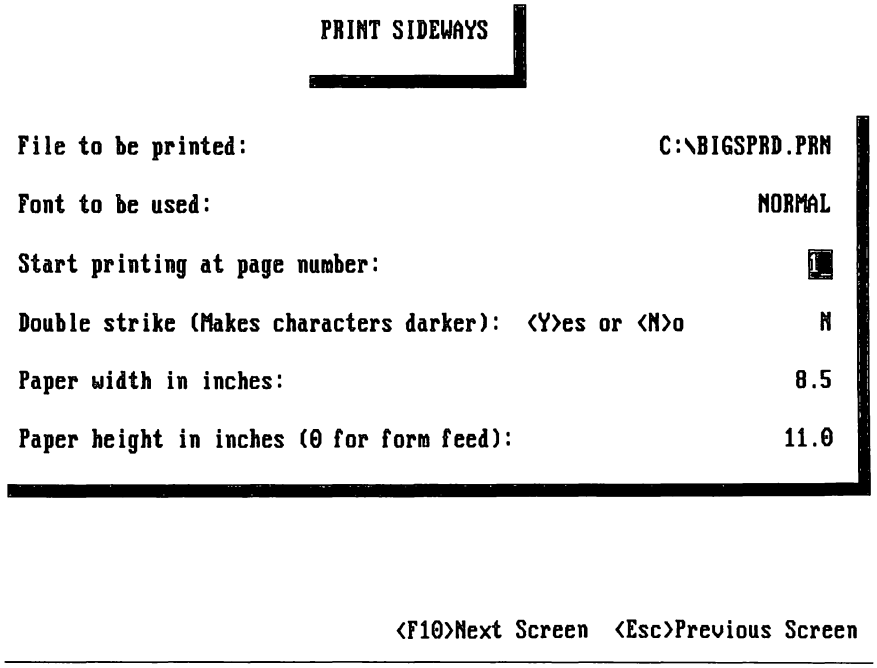
If you know in advance that all the options are correct, you can bypass the three sideways printing screens and immediately start printing by including the name of the print file and the command /GO on the command line when starting On-Side:

```
ONSIDE DEMO.PRN /GO
```

The print sideways screen

Assume for a moment that we want to change some of the options. The first of three screens (FIG. 6-8) contains the following fields.

File to be printed The first prompt asks for the name of the print file. You enter the name of the file you wrote to disk with your report writer or word processor. On-Side lists the .PRN files in a window on the right. You can use the up and down arrows to select one of the files in the window, or you can type the name of a file. (The file need not be displayed in the window to be printed. It can be on a different drive or path or have an extension other than PRN.)



6-8 At this screen, you can choose the file to print and the font to print it in.

The drive letter and pathname are optional. When the print filename has been selected, press Enter to advance to the next field.

Font to be used On-Side can print your reports in a variety of fonts, or letter styles. Once again, On-Side displays a window. This one lists the available fonts. You can use the up and down arrows to select one of the fonts in the window, or you can type the name of a font. On-Side defaults to the NORMAL font, unless you have customized the default font or you have specified a font name on the command line at startup. Entering the command:

```
ONSIDE C:\ONSIDE\DEMO.PRN BOLD
```

tells On-Side to print the file called DEMO.PRN, which is in the directory C:\ONSIDE\, using the BOLD font. If the line also had included /GO, On-Side would print the file then return to DOS without pausing.

Double strike This option makes the printed characters darker by printing them twice. Double strike is useful if the printer ribbon is worn, but it does slow down the printing to half its normal speed.

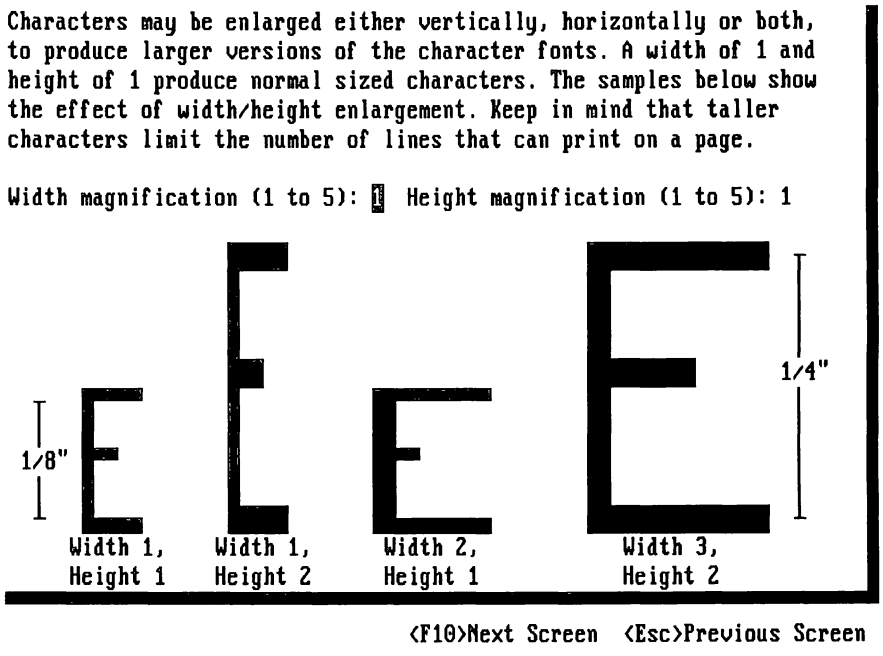
Paper width in inches Most printers use standard letter-size paper, which is 8.5 x 11 inches, so that is the size On-Side uses as its default. Any value from 3 to 20 can be entered here. If your printer uses wide paper, specify 14.5 as the paper width. The paper is slightly more than 14.5 inches in

width, but most wide printers can only print 14 inches across. Specifying more than 14.5 inches can cause some characters to be lost on the right edge of the paper.

Paper height in inches On-Side needs to know the height of the paper so it can skip to a new sheet of paper when starting a new page. Most paper is eleven inches tall, so that is the default. If your printer is set up to use form feeds and top-of-form is set, specify zero for the paper height. On-Side will send a form feed at the end of a page instead of several line feeds. When Enter is pressed in this field, the next screen is displayed.

The magnification screen

The second screen (FIG. 6-9) has only two fields to be entered, but the entire screen is used for illustrating and explaining the concept of character magnification. The text and illustrations on this screen explain the concept of magnifying, or stretching, characters to produce different sized fonts. Some fonts take on a whole new look when they are stretched taller or wider.



6-9 Choose the letter size at this screen.

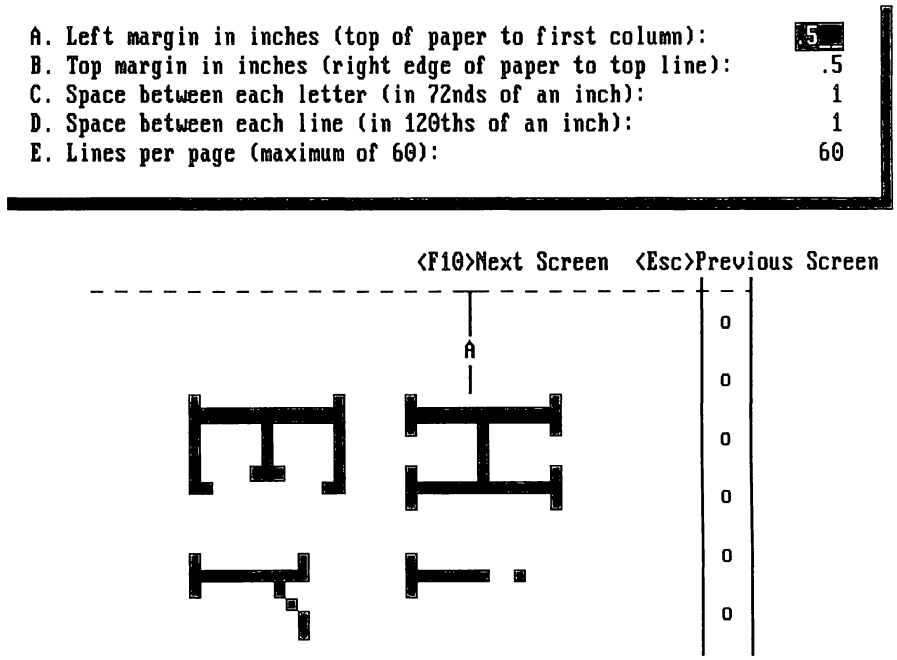
Most reports printed with On-Side use the standard unmagnified characters, but there are times when magnified characters can be useful (to make an enlarged version of a report for a visual aid, or to make a sign

or report cover). When magnifying characters, keep the following points in mind:

- The number of lines that can print on a page are reduced if characters are magnified vertically.
- On-Side forms characters from dot patterns. When characters are magnified, the dots are simply printed larger. Diagonal lines and curves appear much more jagged when magnified.
- Printing speed is slower when printing magnified characters, because there is more to print.

The paper alignment screen

Figure 6-10 shows the third screen, which allows you to tell On-Side how to position its printed output on the paper. The illustration at the bottom of the screen shows a portion of sideways printing in relation to the right edge of the paper. When describing sideways printing, terms such as "top" and "right" can be confusing. (Does "top margin" mean the top in relation to the printer or the top of the printout where the headings are printed?) To reduce this confusion, On-Side displays a flashing line on the screen to indicate visually which measurement the program wants.



6-10 Lay out the page at this screen.

Left margin in inches As the illustration indicates, this measurement is the distance from the paper's top perforation to the edge of the first column of characters. On-Side defaults to half an inch. You can increase or decrease the left margin by changing this value.

The left margin option assumes that the paper in your printer is positioned so the print head is immediately below the perforation. If the print head is not adjacent to the top perforation when printing begins, your left margin will be larger than this field indicates. To reduce it, move the paper downward before printing.

Top margin in inches When you move to this field, the flashing line on the illustration indicates the distance from the paper's right perforation to the top of the first printed line. On-Side defaults to half an inch. You can increase or decrease the top margin of your report by changing this value.

This option assumes that the paper is positioned in the printer so that the print head is immediately to the right of the left perforation. If the print head is indented from the left perforation, the top margin will not be computed correctly, and On-Side might print beyond the right edge of the paper (or, on narrow printers, will lose some data on the right).

Some users keep their print indented intentionally. Perhaps they need a physical left margin for some other program, such as their word processors. They don't want to slide the paper to the right every time they use On-Side. If you encounter that problem, simply tell On-Side that the paper width is narrower. For example, if your paper is lined up so the first column is indented an inch, On-Side really only has 7.5 inches to print on, not 8.5 inches. Change the paper width to 7.5, and On-Side will be able to compute accurate margins.

One final note on left margins and top margins: These margins do not increase if magnification is used. If you enlarge the letters to three times their normal size, these margins still remain exactly as many inches wide as specified.

Space between each letter If the letters seem too crunched together, you can spread them apart by increasing this value. Most of On-Side's fonts have only 1/72 of an inch between the letters (that's the height of one dot on your printer). You can increase this value from two to nine dots.

Each font has a minimum number of dots between each letter. This minimum usually is one, so on most fonts, a value of zero can't be specified for the space between letters. However, a font that connects the letters, such as a script font, might have a minimum of zero, since it's alright for the letters to touch each other.

Adding more space between letters causes the document to spread out somewhat, producing a slightly wider finished product. The standard fonts provided with On-Side have an underscore character that goes across the entire character grid, so if several underscores are together, they connect into one long line. Increasing the space between letters creates a small gap between each of the underscores.

Space between each line You might have noticed that On-Side's printed lines are closer together than the typical horizontal printing that your printer produces. You can increase the space between each line by increasing this value. For example, if you are using the NORMAL font and you want the lines spaced six lines per inch, change this option to 5.

To increase the maximum lines per page slightly, the space between each line can be reduced to zero. This setting doesn't look as bad as it sounds, because most letters won't actually touch the letters above and below them. The only time two letters touch is if a lowercase g, j, p, q, or y comes in contact with a capital letter in the space immediately below it.

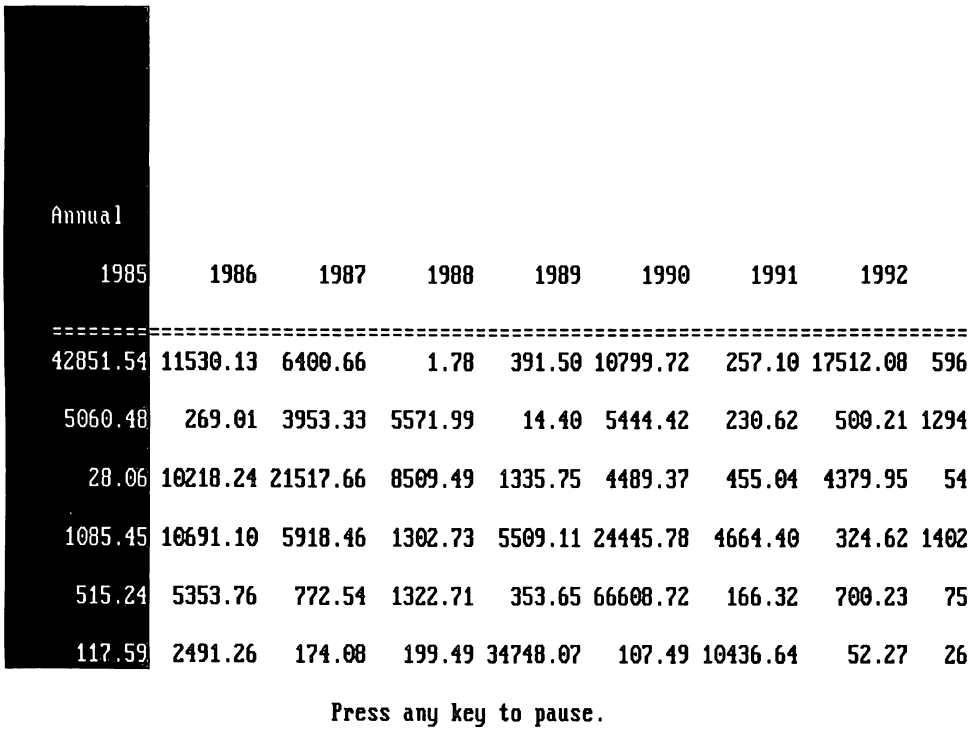
Lines per page The lines per page default to either 60 or the maximum allowed (as computed by On-Side), whichever is smaller. Larger fonts, such as the VOGUE font, permit considerably fewer lines per page because the characters are so tall. Likewise, if a small font's height is magnified (stretched taller), fewer lines fit on a page. On-Side computes the maximum number of lines permitted and displays the maximum on the prompt line as "(maximum of *nn*)." When the cursor moves to this field, a box appears at the bottom of the screen describing how the maximum lines per page can be increased. If the maximum is less than you need, consider one or more of the options listed in the window. When the option is changed, the new maximum is immediately displayed.

Ready to print

When all the options have been selected, make sure your printer is on and that the paper is aligned, then press any key. On-Side displays the current page, as shown in FIG. 6-11, and indicates the portion that is being printed by changing the color on the screen. Only the first 23 lines are displayed on the screen. The first 80 columns also are displayed. If the page is wider than 80, the screen scrolls sideways as On-Side works its way across the page.

You might notice a slight pause on the first few lines of print, as On-Side goes to the disk to read the font file. After a few lines, most of the font letter patterns have been read into memory and the program is able to keep the printer running at its full speed. If the printing seems slower than horizontal printing, that's because in graphics mode (On-Side's mode), the print head only prints when travelling from left to right (unidirectionally), while in character mode it prints when travelling both directions (bidirectionally).

You can tell On-Side to pause the printing by pressing any key. When a key is pressed, a window appears in the middle of the screen. Pressing Esc causes On-Side to stop printing and advances the paper to the top of the page. You then are returned to the print sideways screen. Pressing any key other than Esc causes printing to resume where it stopped. When On-Side has printed every page in the print file, it advances the paper in the printer to the top of the next page and returns to the print sideways screen.



```
Annual
    1985     1986     1987     1988     1989     1990     1991     1992
========================================================================
42851.54 11530.13  6400.66     1.78   391.50 10799.72   257.10 17512.08  596
 5060.48   269.01  3953.33  5571.99    14.40  5444.42   230.62   500.21 1294
   28.06 10218.24 21517.66  8509.49  1335.75  4489.37   455.04  4379.95   54
 1085.45 10691.10  5918.46  1302.73  5509.11 24445.78  4664.40   324.62 1402
  515.24  5353.76   772.54  1322.71   353.65 66608.72   166.32   700.23   75
  117.59  2491.26   174.08   199.49 34748.07   107.49 10436.64    52.27   26

                    Press any key to pause.
```

6-11 The document appears on the screen as it prints (reverse video indicates the lines that have been printed).

Registration

To replace your copy of On-Side, send $19.95 to:

Expressware Corporation
P.O. Box 1800
Duvall, WA 98019
(206) 788-0932

LaserJet and DeskJet Softfonts

(Disk 1463 for LaserJet and Disk 1462 for DeskJet)

Special requirements You'll need an HP LaserJet, DeskJet, or compatible printer. DeskJet printers must have a 128K cartridge installed.

The LaserJet and DeskJet Softfonts are collections of downloadable fonts for use on HP and compatible printers. Buying these fonts as shareware offers a substantial savings over commercial versions. The font files include:

BW180RPN.USP	Broadway 18 point
CE120RPN.USP	Century Legal 12 point
CS100RPN.USP	Computer key tops 10 point
GR100RPN.USP	Greek 10 point
FL120RPN.USP	Flourish 12 point
HV100BPN.USP	Helv 10 point bold
HV100IPN.USP	Helv 10 point italic
HV100RPN.USP	Helv 10 point medium
HV120BPN.USP	Helv 12 point bold
HV120IPN.USP	Helv 12 point italic
HV120RPN.USP	Helv 12 point medium
HV180BPN.USP	Helv 18 point bold
SC120RPN.USP	Script 12 point
SM180RPN.USP	Symbols (Dingbats) 18 point
TR100BPN.USP	Roman 10 point bold
TR100IPN.USP	Roman 10 point italic
TR100RPN.USP	Roman 10 point medium
TR120BPN.USP	Roman 12 point bold
TR120IPN.USP	Roman 12 point italic
TR120RPN.USP	Roman 12 point medium
TR180BPN.USP	Roman 18 point bold

To use the fonts, device drivers are provided for Microsoft Word, Word Perfect, and PC-Write. In addition, three utilities are included:

DOWNLOAD.EXE	To load the fonts into your printer
DISPFONT.EXE	To print samples of a font on your printer
FONTINFO.EXE	To display information about a font

The use of these utilities is explained in the sections that follow.

The DOWNLOAD utility

DOWNLOAD.EXE is an IBM PC utility program that manages the process of downloading soft fonts to a LaserJet, DeskJet, or compatible printer. DOWNLOAD also can select fonts as they are being sent. DOWNLOAD can send a font, or group of fonts, through the standard parallel printer MS-DOS devices to your LaserJet or DeskJet printer. You have optional control over the soft font ID number, whether the font is permanent or temporary, and whether it is a primary or secondary font. A list of fonts can be sent to the printer by specifying the individual fonts names in an ASCII text file. All fonts resident in your LaserJet can be deleted before new fonts are downloaded, or you can reset the printer first.

Font characteristics All soft fonts have three characteristics associated with them. Each font must have a unique ID number assigned to it. This number lets you select a soft font through software commands. Each font

also must be defined as either temporary or permanent. Temporary fonts are deleted whenever the LaserJet is reset and thus are not as widely used as permanent ones, because most software that controls the LaserJet sends a reset command out first, deleting all temporary fonts. Finally, a font can be defined as either primary or secondary. (Note that only one primary and one secondary font can exist at one time and you do not always have to define a primary or secondary font.)

The LaserJet lets you switch between primary and secondary fonts with simple control characters. Ctrl-N selects the secondary font, while Ctrl-D selects the primary font. Embedding these characters in your text file will let you switch between fonts.

Fonts that have ID numbers assigned to them can be selected based on that ID number. To do this you send an Esc, #, X to the printer, where # represents the ASCII soft font ID number. To select soft font ID 15, you would send Esc, (,15,X. Finally, fonts can be selected by font metrics. In this method, you describe the font. A sample Times-Roman selection string would be:

Esc,&,100,Esc,(,O,U,Esc,(slp12v0s0b5T

(12 point, portrait, medium weight, US ASCII, Times-Roman)

The DOWNLOAD program is designed to send soft fonts to the printer and to help you manage all these font characteristics. You can select the font ID number and font status at the same time you download the font. You also can make list files to manage the process of sending a number of soft fonts to your printer at one time. Finally, soft fonts can be archived into a common file and automatically extracted for downloading.

Using DOWNLOAD DOWNLOAD is easy to use. The only thing you need to remember is that DOWNLOAD automatically will prompt you with a brief description of how to use it if you want it to. Simply type DOWNLOAD and press Enter. The program will print a short explanation of its operation and options. DOWNLOAD is used as a command at the DOS prompt as follows:

DOWNLOAD *fontname* [*device*] [*ID*] [*-options*]

fontname	The name of the font to download or the name of a list of fonts to download preceded by an @ character
device	The printer port: LPT1, LPT2, or LPT3
ID	Starting ID number to assign font to (0 to 32767)

The DOWNLOAD options are:

- -T To make a font temporary (use P to make font primary)
- -S To make a font secondary (use Q for quiet operation)
- -D To delete all fonts prior to downloading
- -R To reset the printer

When optional arguments are not present, DOWNLOAD defaults to: LPT1, ID = 0, permanent font, and font is not selected.

Details To run DOWNLOAD, you must specify either the name of the soft font to send to your printer or the name of a disk file that contains a list of soft fonts to send to the printer. You can specify the device to send the file to (LPT1, LPT2, or LPT3). In addition, you can control the three font attributes specified above (ID number, permanent/temporary, and primary/secondary). To download a Times Roman 24-point bold font you would enter:

```
DOWNLOAD TR240BPN.USP
```

The DOWNLOAD program will find that file (if it doesn't exist, DOWNLOAD will let you know) and default to: printer port LPT1, soft font ID 0, and permanent status. The font will not be selected as either primary or secondary. The screen will look like that shown in FIG. 6-12. A more complicated command might involve using a different printer port and assigning a soft font ID number. For example:

```
DOWNLOAD TR100BPN.USP 1000 LPT2 -S
```

sends the bold faced Times Roman font to the LaserJet via LPT2 and assigns it font ID 1000 and permanent and secondary status. The secondary status lets you select this font in a document by embedding a Ctrl-N. You can change back to your primary font with a Ctrl-O.

```
Send soft fonts to a LaserJet or DeskJet printer, V1.8
Copyright 1986, 1987, 1988, 1989 by Elfring Soft Fonts
Sending font tr240bpn.usp with ID 0, 12427 bytes
Sent 1 file, with a total of 12427 bytes.
```

6-12 You will see a message like this one when a font is downloaded.

DOWNLOAD is capable of using a list of filenames created with any ASCII text editor. To do this type:

```
DOWNLOAD @FONTS.LST 10
```

This command instructs the program to find the disk file FONTS.LST. This file is assumed to contain a list of font filenames to send to the LaserJet. All files will be sent in the order they appear in the list. For example, if the file FONTS.LST looks as follows:

```
HE100RPN.USP
HE100BPN.USP
HE100IPN.USP
HE180BPN.USP
HE300BPN.USP
```

then the command DOWNLOAD @FONTS.LST 10 will load all five fonts to your LaserJet through LPT1. The HE100RPN.USP font will be assigned font ID 10 and will be loaded first. Font HE100BPN.USP will be loaded next, with font ID 11. This process will continue sequentially until font HE300BPN.USP is sent to the printer as font ID 14. All fonts will be assigned permanent status. The screen will look like FIG. 6-13 after the downloading process is finished. For a more detailed explanation of soft font ID numbers and font status, see your printer's user's manual.

```
Send soft fonts to a LaserJet or DeskJet printer, V1.8
Copyright 1986, 1987, 1988, 1989 by Elfring Soft Fonts
Sending font he100rpn.usp with ID 0, 12427 bytes
Sending font he100bpn.usp with ID 1, 18834 bytes
Sending font he100ipn.usp with ID 2, 33754 bytes
Sending font he180bpn.usp with ID 3, 48531 bytes
Sending font he300bpn.usp with ID 4, 68929 bytes
Sent 5 files, with a total of 133944 bytes.
```

6-13 Downloading several fonts with a list file.

Another useful option is the D command. This command lets you delete all soft fonts resident in your laser printer, prior to downloading. For example, if you have limited font memory, you can lose track of how many fonts have been sent to the laser printer. Rather than blindly sending more fonts, which can result in a "20" error, you can tell DOWNLOAD to delete all soft fonts first and then send the new fonts to the printer.

```
DOWNLOAD @BATCH.LST 1 -D
```

Finally, the "quiet" option lets you disable much of the screen output from DOWNLOAD. This option is useful particularly with batch files, because you probably are not interested in file statistics when downloading a batch of files. To use the quiet option you would type:

```
DOWNLOAD @BATCH.LST 1000 -QT
```

The -T option used above would give all soft fonts listed above temporary status. They would be erased automatically after the first reset command is sent to the laser printer.

Error messages DOWNLOAD automatically checks the status of your laser printer before sending anything to it. If the printer is off, not connected, deselected, or out of paper, DOWNLOAD will display an error message. For example, if your printer was out of paper, you would see a message like that shown in FIG. 6-14. Answer with the appropriate letter (A, R, or I) followed by a carriage return. This process lets you select the printer or add more paper to correct the problem.

```
download cp300rpn.usp
Send soft fonts to a LaserJet or DeskJet printer, V1.8
Copyright 1986, 1987, 1988, 1989 by Elfring Soft Fonts
Sending font cp300rpn.usp with ID 0
Printer I/O error
Printer out of paper
Abort, Retry, Ignore?
```

6-14 Error message: printer out of paper.

The DISPFONT utility

Do you have problems deciding what soft font to use? It's hard to choose a font without seeing an example of it. What you need is a display sheet, showing what each of your soft fonts looks like. This sheet should show the font name and typeface, a sample alphabet, some representative text, and perhaps a symbol map. You might be able to make the sheet with your word processor and a great deal of work. Instead, you can use DISPFONT and turn these sheets out in no time.

DISPFONT prints a sample sheet of any soft font. The sample sheet contains four basic sections: header, alphabet, text, and symbol map. The header displays the soft font filename, the name of the typeface, and its style, point size, and orientation. The alphabet section displays all the characters in the standard ASCII set. The text section lets you see what the font looks like when printing several lines with that font. Finally, the symbol map shows each character in the font along with the letter of the alphabet or the decimal code required to select that character.

Using DISPFONT Your printer should be running and on-line before starting DISPFONT. To run DISPFONT, simply type in the program name, the name of the soft font to display, and one of several options. DISPFONT assumes you want to use printer port LPT1, unless you tell it otherwise. The basic command structure of DISPFONT is:

DISPFONT *fontname* [*printer*] [-s] [-a] [-#]

where

fontname	The filename of the soft font you want to print a sample sheet of
printer	Printer port (LPT1 default)
-a	Use alphabet in map
-s	Stop symbol map flag
-#	Set line spacing in 48ths

Typical soft font filenames follow the form shown in FIG. 6-15. Example font names include:

```
FFPPPSPN.USO
||||     └ font orientation (P/L)
|||└ font style (R/B/L/I)
||└ point size (tenths of a point)
|└ type face
└
```

6-15 Format of a font filename.

TR100RPN.USP (Times Roman, 10 point, regular, portrait)
TR240BPN.USL (Times Roman, 24 point, bold, landscape)
HE060IPN.USP (Helvetica, 6 point, italic, portrait)

Details The optional printer argument lets you select a printer port to send the sample sheet to. DISPFONT recognizes the standard three parallel printer ports: LPT1, LPT2, and LPT3. If no printer port is included on the command line, DISPFONT defaults to LPT1. The serial printer ports, COM1 and COM2, are no longer supported.

The optional -S argument is used to suppress the printing of a symbol table. If the -S option is not used, you can use the -A option to select an alphabetic symbol map, instead of a decimal one. The line spacing that the program uses now can be controlled using the -# option. Replace the # with any digits that specify how many 48ths of an inch you want to move on each carriage return. Thus, -24 sets the line spacing to 2 lines per inch, -8 gives 6 lines per inch. When no symbol table is printed, you have more room for your customized text. (See the section on "Varying the sample text" for an explanation of this feature.) Typical sample font sheets would look like FIGS. 6-16 to 6-20.

File: hv120bpn.usp, Helvetica: bold 12 pts, portrait

abcdefghijklmnopqrstuvwxyz|[];:'"
ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789'~!@#$%^&*()-_=+\,.<>/?

The quick brown fox jumped
over the lazy dog.

6-16 A DISPFONT example of the Bold Helvetica font.

33=!	34="	35=#	36=$	37=%	38=&	39='	40=(	41=)
42=*	43=+	44=,	45=-	46=.	47=/	48=0	49=1	50=2
51=3	52=4	53=5	54=6	55=7	56=8	57=9	58=:	59=;
60=<	61==	62=>	63=?	64=@	65=A	66=B	67=C	68=D
69=E	70=F	71=G	72=H	73=I	74=J	75=K	76=L	77=M
78=N	79=O	80=P	81=Q	82=R	83=S	84=T	85=U	86=V
87=W	88=X	89=Y	90=Z	91=[	92=\	93=]	94=^	95=_
96=`	97=a	98=b	99=c	100=d	101=e	102=f	103=g	104=h
105=i	106=j	107=k	108=l	109=m	110=n	111=o	112=p	113=q
114=r	115=s	116=t	117=u	118=v	119=w	120=x	121=y	122=z
123={	124=|	125=}	126=~					

File: hv120ipn.usp, Helvetica: normal italic 12 pts, portrait

abcdefghijklmnopqrstuvwxyz {[];:'"
ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789' !@#$%^&()-_=+\|,.<>/?*

The quick brown fox jumped
over the lazy dog.

33=!	34="	35=#	36=$	37=%	38=&	39='	40=(	41=)
42=*	43=+	44=,	45=-	46=.	47=/	48=0	49=1	50=2
51=3	52=4	53=5	54=6	55=7	56=8	57=9	58=:	59=;
60=<	61==	62=>	63=?	64=@	65=A	66=B	67=C	68=D
69=E	70=F	71=G	72=H	73=I	74=J	75=K	76=L	77=M
78=N	79=O	80=P	81=Q	82=R	83=S	84=T	85=U	86=V
87=W	88=X	89=Y	90=Z	91=[	92=\	93=]	94=^	95=_
96=`	97=a	98=b	99=c	100=d	101=e	102=f	103=g	104=h
105=i	106=j	107=k	108=l	109=m	110=n	111=o	112=p	113=q
114=r	115=s	116=t	117=u	118=v	119=w	120=x	121=y	122=z
123={	124=|	125=}	126=~					

6-17 A DISPFONT example of the Italic Helvetica font.

DISPFONT automatically adapts itself to the font you are printing. It will adjust printer orientation and line spacing based on the characteristics of that font. While DISPFONT can handle fonts of any size up to 72 points, it should be noted that the symbol map will be hard to read when the font point size is greater than 40 to 50 points.

If you forget how to use DISPFONT, you can get help by typing the program name with no arguments. However, some examples are given below. To print a sample sheet of an Olde English 20-point font via LPT1 you would type:

```
DISPFONT OD200RPN.USP
```

To send the same font out through LPT2, instead of the default LPT1, enter:

```
DISPFONT OD200RPN.USP LPT2
```

To print a sample sheet of a Helvetica 36-point bold landscape font without the symbol map (assuming you have a LaserJet II) type:

```
DISPFONT HV360BPN.USL -S
```

To print a sample of a Times Roman 18-point font, showing the alphabet in the symbol map instead of the default Alt-key codes:

```
DISPFONT TR180RPN.USP -A
```

Note that you cannot combine the -A and the -S options, because that would have no meaning.

File: ce120rpn.usp, Century Schoolbook: normal 12 pts, portrait

abcdefghijklmnopqrstuvwxyz|[];:'"
ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789'~!@#$%^&*()-_=+\,.<>/?

6-18 A DISPFONT example of the Century font.

The quick brown fox jumped
over the lazy dog.

33=!	34="	35=#	36=$	37=%	38=&	39='	40=(	41=)
42=*	43=+	44=,	45=-	46=.	47=/	48=0	49=1	50=2
51=3	52=4	53=5	54=6	55=7	56=8	57=9	58=:	59=;
60=<	61==	62=>	63=?	64=@	65=A	66=B	67=C	68=D
69=E	70=F	71=G	72=H	73=I	74=J	75=K	76=L	77=M
78=N	79=O	80=P	81=Q	82=R	83=S	84=T	85=U	86=V
87=W	88=X	89=Y	90=Z	91=[	92=\	93=]	94=^	95=_
96=‘	97=a	98=b	99=c	100=d	101=e	102=f	103=g	104=h
105=i	106=j	107=k	108=l	109=m	110=n	111=o	112=p	113=q
114=r	115=s	116=t	117=u	118=v	119=w	120=x	121=y	122=z
123={	124=|	125=}	126=~	127=	128=	129=	130=	131=
132=	133=	134=	135=	136=	137=	138=	139=	140=
141=	142=	143=	144=	145=	146=	147=	148=	149=
150=	151=	152=	153=	154=	155=	156=	157=	158=
159=	160=£	161=¢	162=¥	163=°	164=†	165=‡	166=§	167=¶
168=©	169=®	170=™	171=	172=	173=	174=	175=	176=
177=	178=	179=	180=	181=	182=	183=	184=	185=
186=	187=	188=	189=	190=	191=	192=	193=	194=
195=	196=	197=	198=	199=	200=	201=	202=	203=
204=	205=	206=	207=	208=	209=	210=	211=	212=
213=	214=	215=	216=	217=	218=	219=	220=	221=
222=	223=	224=	225=	226=	227=	228=	229=	230=
231=	232=	233=	234=	235=	236=	237=	238=	239=
240=	241=	242=	243=	244=	245=	246=	247=	248=
249=	250=	251=	252=	253=	254=			

To set the line spacing, you use the -# option. The number passed, which must be less than 49, is the number of 48ths of an inch to move on each carriage return. Thus, 24 gives $^{24}/_{48}$, or $^{1}/_{2}$ inch (2 lines per inch). For example, to set 8 lines per inch type:

```
DISPFONT UV100BPN.USP -6
```

Varying the sample text DISPFONT lets you vary the sample alphabet and text that is printed on each page. This feature gives you the ability to customize these sample sheets in almost any manner.

When the DISPFONT program runs, it assumes the text to be displayed on a sample sheet will be coming from a disk file named DISPFONT.DAT. If this file is not found, DISPFONT prints a default display. If

File: bw180rpn.usp, Broadway: normal 18 pts, portrait

abcdefghijklmnopqrstuvwxyz{[]:;'"
ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789`~!@#$%^&*()-_=+\,.<>/?

The quick brown fox jumped
over the lazy dog.

6-19 A DISPFONT example of the Broadway font.

33=!	34="	35=#	36=$	37=%	38=&	39='	40=(	41=)
42=*	43=+	44=,	45=-	46=.	47=/	48=0	49=1	50=2
51=3	52=4	53=5	54=6	55=7	56=8	57=9	58=:	59=;
60=<	61==	62=>	63=?	64=@	65=A	66=B	67=C	68=D
69=E	70=F	71=G	72=H	73=I	74=J	75=K	76=L	77=M
78=N	79=O	80=P	81=Q	82=R	83=S	84=T	85=U	86=V
87=W	88=X	89=Y	90=Z	91=[	92=\	93=]	94=^	95=_
96=`	97=a	98=b	99=c	100=d	101=e	102=f	103=g	104=h
105=i	106=j	107=k	108=l	109=m	110=n	111=o	112=p	113=q
114=r	115=s	116=t	117=u	118=v	119=w	120=x	121=y	122=z
123={	124=|	125=}	126=~					

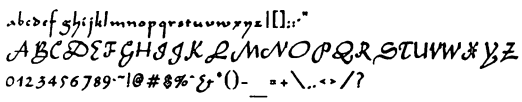
DISPFONT.DAT exists, all text from it is sent to the printer in place of the default display. The program automatically selects the soft font before sending your text.

To modify the file, first plan what you would like your sample sheets to say. A listing of the full font alphabet followed by some sample text is usually best. Use your word processor to modify the text and save the result in ASCII format. To check the format you can use the DOS TYPE command. Just enter:

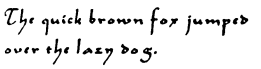
```
TYPE DISPFONT.DAT
```

You should see a complete listing on your PC screen of the text you just entered with no special characters. If special characters do appear in the listing, the file probably has not been saved in ASCII. (As a last resort you

File: fl120rpn.usp, Flourish: normal 12 pts, portrait



6-20 A DISPFONT example of the Flourish font.



33=!	34="	35=#	36=$	37=%	38=&	39='	40=(	41=)
42=*	43=+	44=,	45=-	46=.	47=/	48=0	49=1	50=2
51=3	52=4	53=5	54=6	55=7	56=8	57=9	58=:	59=;
60=<	61==	62=>	63=?	64=@	65=A	66=B	67=C	68=D
69=E	70=F	71=G	72=H	73=I	74=J	75=K	76=L	77=M
78=N	79=O	80=P	81=Q	82=R	83=S	84=T	85=U	86=V
87=W	88=X	89=Y	90=Z	91=[	92=\	93=]	94=^	95=_
96=`	97=a	98=b	99=c	100=d	101=e	102=f	103=g	104=h
105=i	106=j	107=k	108=l	109=m	110=n	111=o	112=p	113=q
114=r	115=s	116=t	117=u	118=v	119=w	120=x	121=y	122=z
123={	124=|	125=}	126=~					

can use the EDLIN program supplied with DOS to edit the file. Using EDLIN will guarantee that you have an ASCII file.)

DISPFONT expects to find the sample text file, DISPFONT.DAT, in the current directory. If you keep the DISPFONT utility in a tools subdirectory, accessed by the environment path, you will need to keep a copy of the .DAT file in your current working subdirectory.

Displaying a soft font DISPFONT operates by first examining the soft font to be printed. It uses information from the soft font header to determine printer orientation and line spacing. Next, DISPFONT downloads the soft font in question to your printer as a temporary font, ID 757. It then prints a sample sheet, switching between your printer's internal Courier font and the soft font.

In the display process, DISPFONT resets your printer, to delete all temporary soft fonts and deselect any other special features you have enabled. In addition, DISPFONT downloads the soft font (in the temporary mode) as ID 757. It is possible, although unlikely, that the new soft font will overlay a soft font with the same ID already in the printer. If an old soft font is overlaid, that soft font will be deleted, even though it was a permanent font. Finally, DISPFONT sends a second reset to the printer to remove the soft font it just downloaded and the margins and line spacing it set.

DISPFONT understands the standard 25 typefaces assigned by HP (faces 0 through 24) and uses this information to print the typeface name on the header line of each sample sheet. If an unknown typeface number is incorporated in a font, DISPFONT will extract the display font name (the

name shown on a LaserJet II font printout) from that font and show that on the header line. The font weight also is examined and used to determine whether a font is light, normal, or bold. A number of older fonts (Bitstream's in particular) do not have a correct display font name.

The display text is arranged so that most fonts up to 60 points in size can be displayed. DISPFONT adjusts the symbol map automatically based on the number of characters in a font.

The FONTINFO utility

FONTINFO will display (in English, not gibberish) all the basic characteristics of a font. In addition, FONTINFO indicates whether a font is for a LaserJet or a DeskJet printer. (Neither will work in the other.)

Using FONTINFO As with the other LaserJet and DeskJet utilities, you can type the program name by itself for a help screen. FONTINFO is quite simple and needs only a single argument to run. Just give it the name of the font to examine, and FONTINFO will print out a detailed description of the font.

FONTINFO *fontname*

FONTINFO will print a detailed table of that font's characteristics on the screen. You can send this information to the printer for a permanent record by using:

FONTINFO *fontname* > PRN

For example to look at the Broadway font.

FONTINFO BW140RPN.USP

The program will respond as shown in FIG. 6-21.

```
Copyright 1988 by Elfring Soft Fonts, Version 1.1

Font name:      Broadway      -LaserJet font
Orientation:    portrait
Height:         14.0 points
Style:          Upright
Weight:         0 (normal)
# Characters:   94 (ASCII)
Symbol set:     21 (US ASCII)
Spacing:        proportional with a  2.65 point space
Type face:      21 (Broadway)
Baseline: 47,   Cell Height: 64,  Cell Width: 57  (in dots)
Serif Style:    Sans Serif Square (not set?)
Print Quality:  Data Processing  (not set?)
First char:     Not set
```

6-21 Information displayed by the FONTINFO program.

FONTINFO understands all the standard details about typeface names, font styles, symbol sets, and font weights. A few descriptions of these are presented below.

Display font name. If you own a LaserJet series II, the display font name is the name that will be displayed in the font printout. A number of older HP soft fonts do not correctly display their soft font names. For most modern soft fonts, the display font name should be the name of the font you are using. The LaserJet II will append the word "bold" or "italic" to this name if the font fits that characteristic.

Font orientation. A font is either oriented in the portrait mode (characters run left to right across the 8-inch width of the paper) or the landscape mode (characters run left to right across the 11-inch width of the paper). There is no real difference between a portrait and landscape font; both produce identical characters. The information in a landscape font is simply arranged differently.

Font height. Font height is the height of a font in points. There are 72.27 points per inch. The font height is the distance from the top of an uppercase character to the bottom of a lowercase character's descender. (The top of an *A* to the bottom of a *j*.) Thus, no character in the font is that height. Due to resolution problems in the font height information entry, most fonts display as fractional point sizes. Therefore, a 30-point font might be displayed as 29.8 points.

Font style. A font can be either upright or slanted. A slanted font usually is considered to be italic, with some noted exceptions. (Script is a slanted font but is not italic.) Actually, for the more technically inclined, a slanted font is really oblique and not italic.

Font weight. Fonts can have weights (how dark they are) ranging from −7 to +7. A weight of 0 is considered medium. Negative weights are considered light, while positive weights are considered bold. FONTINFO automatically interprets this information for you.

Characters in font. Characters in font describes the range of characters in a font. A 127 indicates that characters can range from 33 to 127. A 254 font can contain all those characters plus characters ranging from 160 to 254.

Font symbol set. The symbol set describes the assignment of characters within a font. Most soft fonts are either US ASCII or Roman-8. However, a large number of other symbol sets are possible. The symbol set number is printed, followed by an interpretation of it. FONTINFO understands the names of over 17 different symbol sets and will display this information or the word "unknown" automatically.

Font spacing. Font spacing can be either fixed width or proportional. If the font is proportionally spaced, FONTINFO will tell you, along with the width of a space character in that font. If the font is fixed width, the program will display the number of characters per inch for that file.

Typeface. A font can have a typeface number ranging from 0 to 255.

Font numbers 0 to 26 have been assigned by HP and will be translated by FONTINFO into their corresponding names. Other font names will result in the word "unknown" being printed for the font name.

Base line, cell height, and cell width. Each font must define the maximum height of a character, its maximum width, and where that character sits in the cell (base line). If you try to combine two different fonts on the same line that have different base lines, even though the fonts are the same size, the result will be disaster.

Serif style. A font can have the serif style defined in it. Only newer fonts have this attribute set.

Print quality. Most new fonts have the print quality set, especially DeskJet fonts. Print quality ranges from draft to letter quality. Older LaserJet fonts will probably indicate draft quality here. (Draft quality doesn't matter for a laser printer.)

First character and last character. Defines the first and last characters in a font. Because a font doesn't have to contain every character, defining the first and last characters allows you to determine what characters are in a font.

Registration

To register your copy of Elfring Soft Fonts' DeskJet Softfonts, or LaserJet Softfonts, send $25 to

Elfring Soft Fonts
P.O. Box 61
Wasco, IL 60183
(708) 377-3520

Swap Shop (Disk 887)

Special requirements None.

Swap Shop is a collection of utilities that switch the addresses of your serial and parallel ports. Switching port addresses can be useful under a variety of circumstances. For example, you have a printer connected to the parallel port LPT2 but you want to use it with software that will recognize only LPT1. You can use a Swap Shop utility to electronically swap LPT1 and LPT2, rather than physically swapping the cables yourself. Swap Shop includes an additional utility to deactivate any serial or parallel port. In all, there are six utilities that make up Swap Shop.

SWAP.COM	Swaps any of the LPT or COM ports
SWAPCOM.COM	Swaps any of the COM ports
SWAPLPT.COM	Swaps any of the LPT ports
SWCOM12.COM	Swaps COM1 with COM2

SWLPT12.COM	Swaps LPT1 with LPT2
DEACT.COM	Deactivates any of the LPT or COM ports

These utilities are explained individually below.

Using SWAP

SWAP is the most general of the swapping utilities. It will allow you to swap the addresses of any of the parallel or serial ports. To use SWAP.COM, simply type at the DOS command line

```
SWAP/p/xy
```

where

p	*p* is the port type: either C (for COM ports) or L (for parallel ports)
xy	*x* and *y* are each numbers from 1 to 4 representing the port numbers you want to swap.

The port type (C or L) can be upper- or lowercase. Be sure there are no spaces on the command line. For example to swap COM ports 1 and 2, type

```
SWAP /C/12
```

To swap LPT ports 2 and 4, type

```
SWAP/L/24
```

After SWAP is run, the port reassignment will remain in effect until the system is rebooted or until SWAP is run again.

Using SWAPCOM

SWAPCOM is a subset of SWAP used for swapping the serial ports only. To use SWAPCOM.COM, simply type

```
SWAPCOM/xy
```

where *x* and *y* are each numbers from 1 to 3, representing the COM port numbers you want to swap. For example, to swap ports 1 and 2, type

```
SWAPCOM/12
```

To swap ports 2 and 3, type

```
SWAPCOM/23
```

Take care not to type any spaces in the command. After SWAPCOM is run, the port reassignment will remain until you reboot or until SWAPCOM is run again.

Using SWAPLPT

SWAPLPT works exactly the same way for LPT ports as SWAPCOM does for COM ports. To use SWAPLPT.COM, simply type

```
SWAPLPT/xy
```

substituting 1, 2, or 3 for *x* and *y* to indicate the ports you want to swap. For example.

```
SWAPLPT/23
```

swaps LPT2 with LPT3. Again, don't type any spaces in the command line. After SWAPLPT is run, the port reassignment will remain until you reboot or until SWAPLPT is run again.

Using SWLPT12

SWLPT12 is a subset of SWAPLPT. SWLPT12.COM will swap the base addresses for LPT1 and LPT2. Any output sent by the system to one will be redirected to the other. To run it, type just the command without any parameters

```
SWLPT12
```

To restore the ports to their original addresses, simply run SWLPT12 again.

Using SWCOM12

SWCOM12.COM performs the exact same operation as SWLPT12, with the exact same result, except it works on the serial ports COM1 and COM2. To swap COM1 and COM2, simply type

```
SWCOM12
```

To restore the ports to their original addresses, simply run SWCOM12 again.

Using DEACT

DEACT is a little bit different than the others. It doesn't swap ports, it turns them off. To deactivate a serial or parallel port use DEACT.COM as follows

```
DEACT/p/x
```

where

p *p* is the port type: either C (for COM ports) or L (for parallel ports)

x *x* is a number from 1 to 4 representing the port number you want to deactivate.

For example, to deactivate COM1, type

```
DEACT/C/1
```

To deactivate LPT3, type

```
DEACT/L/3
```

Be sure not to include any spaces in the command line. After DEACT is run, the port will be deactivated as though the hardware were not installed. The port will remain deactivated until the system is rebooted.

Registration

The Swap Shop utilities are available individually from the source shown below. The registration fees are:

SWAP	$3
SWAPCOM	$5
SWAPLPT	$5
SWLPT12	$5
SWCOM12	$5
DEACT	$3

Please direct comments, suggestions, and registration fee to

Dale Botkin
P.O. Box 37718
Omaha, NE 68137

7
Processor speed control

Processor speed seems to be an eternal issue in the PC world. Over the past decade, we've seen processor speeds increase from 4.77 MHz up to 33 MHz, with no end in sight. Most people probably don't really know what a MHz is, nor do they care. They just know they want more. If you're one of those people who want to squeeze out the last MHz your PC will offer, take a look at PC-Zipper. It checks out your PC's hardware to see if it can handle going a little faster. If it can, PC-Zipper lets you push it to the limit.

All of the speed increases in past years have left some older, but otherwise useful, programs in the dust. These programs depend on the timing of the older PCs and won't work right on a faster PC. AT-Slow will throttle the processor speed of faster PCs and make those programs useful to you again.

PC-ZIPPER (Disk 1572)

Special requirements None.

You probably could be running your PC a little bit faster than it's running now. PC-ZIPPER can make your PC go as fast as it possibly can, without suffering any hardware or software errors. First, PC-ZIPPER tests your PC to determine how much faster your hardware can actually go. Based on the test results, you then can increase the processor speed to the maximum abilities of your PC. The speed increases aren't necessarily dramatic, but every little bit counts. PC-ZIPPER also allows you to set your PC's speed back to normal or even to slow it down a bit. PC-ZIPPER does not stay resident, so it won't take up any memory space.

Using PC-ZIPPER

There are two steps to the process. The first step determines if your PC hardware can go any faster and, if so, what parameter should be used for the next step. To start the first step, type

```
ZIPTEST
```

at the DOS prompt. This command will run the ZIPTEST.EXE program. When ZIPTEST has finished checking your hardware, it indicates a letter from A to W, which you will use as the parameter for the next step. For the next step, type

```
ZIP x
```

where *x* is a letter from A to Z indicating the following:

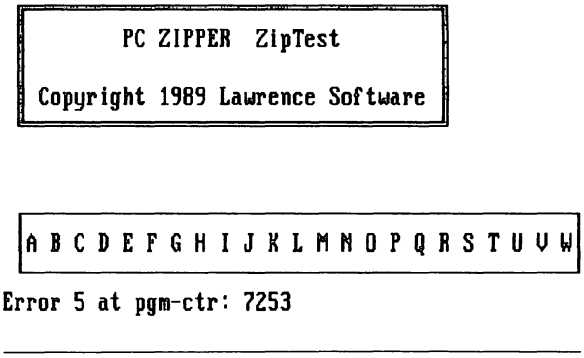
A	Returns the speed to normal if ZIP has been run previously with one of the other parameters. It does nothing if ZIP has not already been run.
B to W	Speeds up the computer. Use the parameter recommended by ZIPTEST.
X, Y, or Z	Slows the computer down.

Details

Figure 7-1 shows the output of ZIPTEST after it has been run. In this example, ZIPTEST recommends the E parameter for ZIP. If ZIPTEST terminates prematurely with a system error, as shown in FIG. 7-2, you probably have at least one defective memory chip. However, you can still use ZIP to boost the speed of your PC. Simply make a note of the parameter

```
        PC ZIPPER  ZipTest

 Copyright 1989 Lawrence Software


 A B C D E F G H I J K L M N O P Q R S T U V W
         ↑

 Use command line parameter  E  with PC-ZIPPER

C:\>
```

7-1 ZIPTEST recommends a parameter for use with the ZIP program.



7-2 When you get a strange error message, you probably have a bad chip.

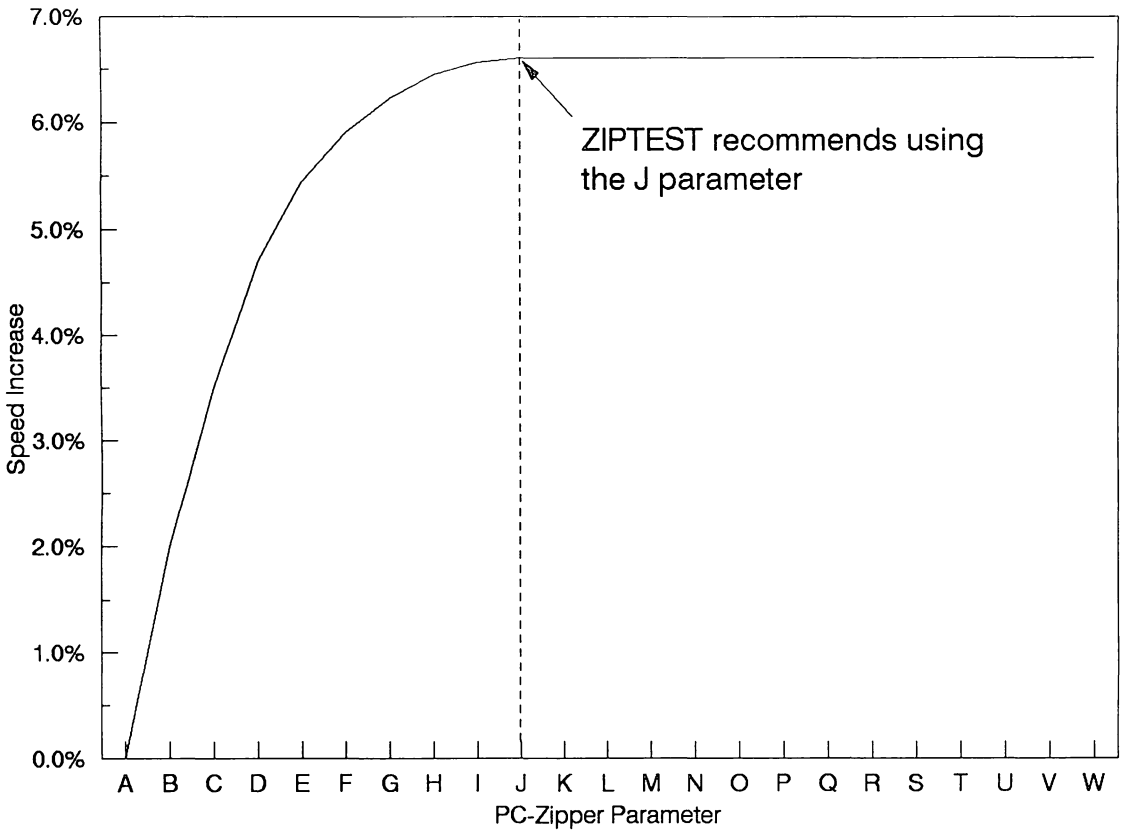
reached when the error occurred and use ZIP with a parameter several levels lower.

You really only need to run ZIPTEST once to determine the appropriate parameter for ZIP. After that, you can include ZIP along with the appropriate parameter in your AUTOEXEC.BAT file. That way, ZIP will automatically set your PC to maximum speed when you turn it on.

How PC-ZIPPER works

Skeptics will question whether this increase in speed really is possible. It seems too much like you're getting something for nothing. Actually, you're just getting the most out of what you already have. The primary factor that limits your PC's speed is the speed of its memory chips. It's a fact of life that no two memory chips are created equal. As a result, each one has a slightly different maximum operating speed. Just as a chain is as strong as its weakest link, the fastest speed a given PC can handle is that of its slowest chip. To assure error-free operation, PC manufacturers fix the processor clock speed below slowest possible chip. It is not practical for a manufacturer to test each PC and set its clock speed to the maximum. However, there's no reason you can't do it yourself with your own PC. If you have a good set of chips, you'll be able to increase the processor speed accordingly.

The function of ZIPTEST is to determine the optimum speed for your system. It checks the relative speed increase resulting from each ZIP parameter. Upon completion, ZIPTEST checks to find which procedure resulted in a negligible increase in processor speed. Figure 7-3 shows how the procedure works. Optimum system performance results at the crest of the ZIP parameter vs. computing speed curve. In this example, ZIPTEST would recommend parameter J for use with ZIP. Use of a higher parameter will not significantly increase your system speed and might cause errors if you have weak or defective memory chips.



7-3 ZIPTEST measures the processor speed increase with each ZIP parameter and chooses the optimum.

Registration

To register, send $9.95 to

Lawrence Software
Suite #1A-158
603 West 13th Street
Austin, TX 78701

AT-SLOW (Disk 1834)

Special requirements AT compatible with an 80286 or 80386 processor.

At a time when the PC world is constantly pushing for more and more speed, it might seem odd that anyone would ever want to purposely slow a PC down. AT-SLOW is intended to do just that. It will put the brakes on a PC when it is simply going too fast. Many early programs were designed with the assumption that all PCs would always run at a clock speed of 4.77 MHz, like the original IBM PC.

With newer, faster PCs, however, many such programs are virtually unusable, especially game programs where timing is critical. If you've ever tried to run an old game program on a fast PC, you've probably encountered this phenomenon. In the bat of an eye, you can be completely overrun by the mutant warriors from outer space with no time at all to react. There's no reason to despair. Just use AT-SLOW to retard the processor speed to the approximate rate of the original IBM PC, and you'll be able to use the program as it was originally intended. Perhaps you always get overrun by the mutant warriors, even when the game is running at its correct speed. Maybe you'd like to get back at them just once. Bog them down as much as you need with AT-SLOW and blow them all away.

There are other perhaps more serious uses for AT-SLOW. Sometimes with older programs, screen displays whiz by so fast you can hardly see them. For programmers, AT-SLOW can be useful during the debugging process by providing a convenient way to slow down program execution speed enough to see what's going on. Also, it can allow programmers to evaluate how well their programs will perform on slower PCs.

Using AT-SLOW

AT-SLOW is used as a command at the DOS prompt.

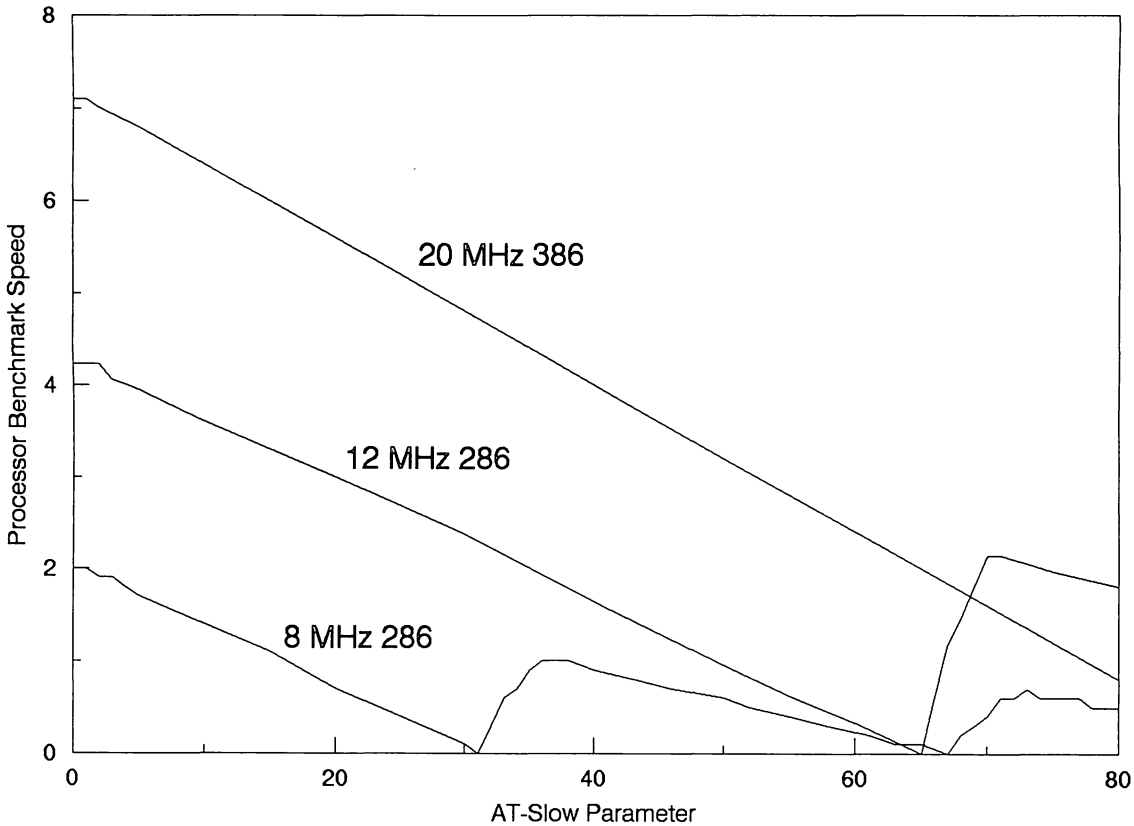
```
AT-SLOW [/t###] [/t+] [/t-] [/f#] [/h] [/?]
```

The parameters for AT-SLOW are

/t###	### is the amount to slow down. Valid range is 0 to 999.
/h	Displays a help screen.
/f#	Fix value for high speed machines. Valid range is 1 to 9. Use this parameter when AT-SLOW does not seem to work or is disabled by higher speed machines. Default value is 1.
/?	Show current program settings.
/t-	Turn AT-SLOW off (return to normal).
/t+	Turn AT-SLOW back on (return to previous AT-SLOW setting).

Details

The range of values for delay is 0 to 999. Figure 7-4 shows the relative effect of the delay parameter on several different types of PCs. Values from about 20 to 60 usually are adequate for 286-based PCs. Notice that as the delay value is increased there will come a point when the computer actually begins to speed back up. This increase in speed is because the delay is too great for the computer to service all the interrupts being generated. Reduce the delay value slowly until there is a sudden decrease in performance.



7-4 As you increase the parameter, you will see a smooth decrease in processor speed; however, after a certain point the speed will increase again.

Once it is installed, AT-SLOW can be turned off by using the `/t-` option and can be turned back on using the `/t+` option or by changing the delay value. The `/t-` option will disable the timer interrupt and return the computer to normal speed. AT-SLOW should not be removed or disabled using memory management programs because the interrupt might remain active, causing a 20 to 30% reduction in performance. The program uses very little memory and, when it is disabled, it does not affect performance, so leaving it in memory should not be of great concern.

How AT-SLOW works

To slow down the processor, AT-SLOW uses the real-time clock found in ATs, PS/2s, and compatibles (that's interrupt 70h). It does not, however, affect the speed of the clock itself. Using the real-time clock's interrupt has two advantages over using the microprocessor timer. First, the high resolution of the AT clock allows much more precise control over the processor speed. In other words, you can slow the speed down in finer increments.

Second, almost any program will work with AT-SLOW because very few programs bother with the AT clock interrupt. This compatibility is not true of other slow-down programs that use the regular PC timer.

Registration

To register, write to

David Keil
Better Software Company
10 W. Wilburn Avenue
Greenville, SC 29611

The registered version of AT-SLOW has some additional options, including:

- Enabling a hotkey to change the slow-down value. This feature remains active even in programs that normally disable hotkey routines.
- Removing AT-SLOW entirely from memory.
- Eliminating the need to push a key to end the program. This feature allows it to be used more easily in batch files

Appendix

This table shows keyboard scan codes that can be used for alternate hotkeys in TSR programs.

Key	Hex	Key	Hex	Key	Hex
Esc	01	Enter	1C	PrtSc	37
!1	02	Ctrl	1D	Alt	38
@2	03	A	1E	Space	39
#3	04	S	1F	CapLk	3A
$4	05	D	20	F1	3B
%5	06	F	21	F2	3C
^6	07	G	22	F3	3D
&7	08	H	23	F4	3E
*8	09	J	24	F5	3F
(9	0A	K	25	F6	40
)0	0B	L	26	F7	41
_-	0C	:;	27	F8	42
+ =	0D	"'	28	F9	43
backsp	0E	~`	29	F10	44
tab	0F	LSHFT	2A	NumLk	45
Q	10	| \	2B	ScrLk	46
W	11	Z	2C	Home	47
E	12	X	2D	Up	48
R	13	C	2E	PgUp	49
T	14	V	2F	-	4A
Y	15	B	30	Left	4B
U	16	N	31	5	4C
I	17	M	32	Right	4D
O	18	<,	33	+	4E
P	19	>.	34	End	4F
{[	1A	?/	35	Down	50
}]	1B	RSHFT	36	PgDn	51

The following table shows the hexadecimal values for the possible shift key states:

Shift key value	Alt	Ctrl	Left Shift	Right Shift
0				
1				*
2			*	
4		*		
5		*		*
6		*	*	
7		*	*	*
8	*			
9	*			*
A	*		*	
B	*		*	*
C	*	*		
D	*	*		*
E	*	*	*	
F	*	*	*	*

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4.	[ ][ ][ ][ ]	16.	[ ][ ][ ][ ]
5.	[ ][ ][ ][ ]	17.	[ ][ ][ ][ ]
6.	[ ][ ][ ][ ]	18.	[ ][ ][ ][ ]
7.	[ ][ ][ ][ ]	19.	[ ][ ][ ][ ]
8.	[ ][ ][ ][ ]	20.	[ ][ ][ ][ ]
9.	[ ][ ][ ][ ]	21.	[ ][ ][ ][ ]
10.	[ ][ ][ ][ ]	22.	[ ][ ][ ][ ]
11.	[ ][ ][ ][ ]	23.	[ ][ ][ ][ ]
12.	[ ][ ][ ][ ]	24.	[ ][ ][ ][ ]

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Utilities, System or Hardware

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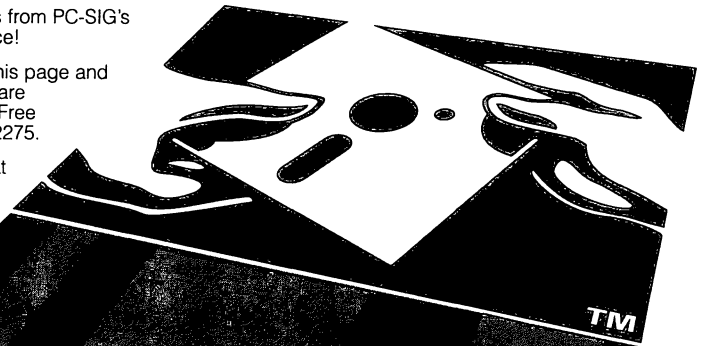

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☐ **#331 Medlin Accounting** The General Ledger, Accounts Payable, Accounts Receivable, and Payroll packages round out this full-charge accounting program for the small business. Top-rated software! *Requires two floppy drives. Registration fee: $35 for PC-GL; PC-AP; PC-AR; PC-PR. $25 for PCINV*

☐ **#2059, 2060, 2061 Painless Accounting** If you are looking for a full-featured accounting program, then PAINLESS ACCOUNTING may be your program. It is like Dac Easy Accounting in the way the account numbers are used and in the way the menus are laid out. On the other hand, PAINLESS ACCOUNTING is more business oriented than Dac Easy Light, which is good for those small businesses looking for an inexpensive accounting program. *Requires 640K RAM, and a hard drive. Registration fee: $125.00*

☐ **#565 PC-Payroll** The complete payroll system for mid-sized companies (40-140 employees). Everything from time records and 401(K) plans to tax computations and paycheck printing. *Requires 384K RAM and two floppy drives, hard disk recommended. Registration fee: $145.00*

☐ **#1762 W2/1099-Misc Generator** Let W211 print your W2 and 1099 tax forms this year. W211 is designed for the small business owner or tax preparer who needs to prepare these forms for their employees or clients. *No special requirements. Registration fee: $49.00*

Accounting, Inventory Control

☐ **#1910 PC-Inventory+** An inventory program — not an accountant, not a cash register — just an inventory program. But if that's all you want, then this one is easy to use with lots of screen help and good report features. *No special requirements. Registration fee: $25.00*

Accounting, Job Costing and Bill of Materials

☐ **#1230, 2674 Job Cost** A job-cost control system for multiple job cost centers. Do variance studies with budget controls, project profit and loss estimates and cost entire job. *Requires 640K RAM, a hard disk, and a printer. Registration fee: $45.00*

Accounting, Purchase Orders

☐ **#741 Purchase Order System** Track all P.O.'s, open and cleared, and list all your vendors with this system. *Requires 640K RAM, a hard drive. Registration fee: $69.00*

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Accounting, Time-Billing Management

☐ **#1168 BillPower Plus** Integrated timekeeping, bookkeeping and billing system. A single-entry program, it tracks 15 employees and thousands of clients. *Requires 512K RAM and a hard drive. Registration fee: $150.00*

☐ **#825 Time Tracker** Automated billing system tracks accounts receivable and prints itemized invoices ready for mailing! Also documents time spent on client work. A professional time billing program that does it all — simply. Prints plain paper invoices and plenty of reports. Includes complete A/R. *Requires 512K RAM. A hard drive is recommended. Registration fee: $69.00*

Databases

☐ **#2082, 2083, 2084 PC-File** PC-FILE — A flexible database with the unbeatable combination of ease of use, power and versatility. *Requires 512K RAM, DOS 3.0, and a hard drive or two high density floppy drives. Registration fee: $149.95*

Desktop Organizers

☐ **#405 PC-DeskTeam** Pop-up desktop productivity tools — An appointment calendar, an alarm, a phone book with auto-dialer, DOS access, printer controls and a calculator. All there when and where you need them. *No special requirements. Registration fee: $29.95*

Form Creation Programs

☐ **#2329 FormGen - Business Form Collection** A collection of business forms for use with FormGen. Standard invoices, purchase orders, credit applications, accounting forms, fax letters, etc. that you can use "as is", or modify to suit your needs. Over 70 commonly used business forms. *Requires Formgen, PC-SIG Disk #1695. Registration fee: $15.00*

Graphing Programs

☐ **#669, 670 Graphtime-II (CGA/EGA)** A business and technical graphics system with text and font editors. Designed for use with dBASE II/III, Multiplan, Lotus 1-2-3 and ASCII files, it can also be used on its own with data entered from the keyboard into the built-in spreadsheet. *Requires 640K RAM, CGA, and hard drive. Registration fee: $49.95*

Hard Drive Utilities

☐ **#1188 Point & Shoot Backup/Restore** Make fast, easy backups of your hard disk! *Requires 320K RAM and hard drive. Registration fee: $35.00*

Label Makers

☐ **#1150, 1679 Simply Labels III** Design labels any size or format for mailing, files, VCR tapes or anything else that needs a label. *Requires printer. Registration fee: $25.00*

Menu Programs

☐ **#608 Automenu** Let AUTOMENU help you find your way around DOS. With or without a mouse, create your own "point-and-shoot" menus to find and run all your programs. *Requires hard drive recommended. Registration fee: $69.95*

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☐ **#1097 Resumebest** The first thing most employers see of us is our resume. Use RESUMEBEST to create a good-looking, properly prepared resume. *Requires a version of BASIC and a printer. Registration fee: $29.95*

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☐ **#2182 PBWindows** A wonderful windowing utility for users of Spectra Publishing's PowerBASIC. Include PBWINDOW.INC in your program and start creating. *Requires PowerBASIC program, V2.10. Registration Fee: $25.00*

☐ **#2631, 2632, 2633, 2634, 2635, 2636 PowerBASIC BBS Library** *Requires PowerBASIC compiler. Registration Fee: None.*

Programming, C

☐ **#1007, 1705 "c_wndw" and "c-ndx" Libraries** For C programmers — add full screen, color, cursor control, windows, and relational database facilities to your programs without the need for complex programming. *Requires a version of Turbo C or Microsoft C. Registration Fee: $79.00*

☐ **#577, 578 C Tutor** A comprehensive tutorial on programming in C which assumes a moderate amount of programming expertise. C source code is included. *Registration Fee: $15.00 to $39.95.*

☐ **#1872, 2306 FlashPac C Library** Add blinding speed and style to your C programs with the FLASHPAC C LIBRARY, a library of low-level input/output routines. *No special requirements. Registration Fee: $50.00*

☐ **#2032 MPLUS Graphic Interface Library** MPLUS is a graphic interface library for Microsoft C version 5.0. *Requires CGA, VGA, or EGA, Microsoft C version 5.0, and a mouse. Registration Fee: $50.00*

☐ **#1337 PCC Personal C Compiler** A fast and compact C compiler package with a lot of power. *No special requirements. Registration Fee: $30.00*

☐ **#873, 1113, 2556 Window Boss** C programmers — create pop-up windows, pull-down menus, status lines and context-sensitive help functions in any program you write. *Requires C compiler. Registration Fee: $55.00*

☐ **#2171 QC_UTIL (QC_TOOLS)** Set of interrupt utilities designed to help C programmers with cursor movement, screen paint, boxes, keyboard buffer control and much more. Reference The New Peter Norton Programmer's Guide. *Requires Microsoft Quick-C Compiler. Regis tration Fee: $10.00*

Programming, Pascal

☐ **#1982, 2093 FlashPac Pascal Library** Low level Turbo Pascal routines that access the video display, keyboard, printer, disk, and mouse devices. These do not replace the standard features of Turbo Pascal, but add to and extend them for DOS. *Requires A version of Turbo Pascal. Registration Fee: $50.00*

☐ **#1321 Pascal Translator** The package consists of a Pascal to p-code translator and a p-code interpreter. The translator accepts standard Pascal programs with C masking and shifting extensions and produces text assembly language files that the interpreter program executes directly. *No special requirements. Registration Fee: $65.00*

☐ **#579, 580 Pascal Tutor** A thorough tutorial for the beginning programmer in Borland's Turbo Pascal compilers 3.0, 4.0, 5.0 and 5.5. Fundamental concepts of Pascal programming are addressed crisply and concisely. *Requires a printer. Registration Fee: $15.00 to $39.95.*

☐ **#1935 PopText** This help-screen generation utility for Turbo Pascal and Assembly language programmers allows programmers to easily integrate pop-up style help windows into their own programs. *Hard drive recommended. Registration Fee: $25.00*

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☐ **#1651, 1652 TechnoJock's Turbo Toolkit** TechnoJock's Turbo Toolkit (TTT) is a comprehensive set of procedures and functions for Turbo Pascal and Quick Pascal programmers. The Toolkit is designed for professional programmers, as well as newcomers. *Requires Turbo Pascal 4.0 (or greater), or Quick Pascal, and an unarchiving program. Registration Fee: $49.95*

☐ **#1353 Turbo Designer** Programmer's toolbox for the Turbo Pascal compiler — helps you easily generate code to create pull-down menus, pop-up menus, and sophisticated hypertext help screens in your applications. *Requires 512K RAM, hard drive, and TURBO Pascal v4.0 or higher. Registration Fee: $25.00.*

☐ **#2257 Turbo-Screen System** A tool for Turbo Pascal programmers who wish to develop screen I/O procedures quickly, TURBO SCREEN SYSTEM generates source code directly from "screen panel" files which you can design. *Requires Turbo Pascal 4.0 (or greater). Registration Fee: $33.00*

Programming, Tools

☐ **#1765 Pro-Inst** Programmers, here is a program that allows you to automate even the most complex application installations. It walks the user through the entire installation, with prompt screens and help text you create. *Requires High density floppy drive or a hard drive. Registration Fee: $20.00*

☐ **#2359 Screen Debut** SCREEN DEBUT is a program used to build and develop text screens in any of four languages. Ansi code for use with DOS, Basic code with and without line numbers, C code for Turbo Pascal, and compressed binary format. *CGA recommended. Registration Fee: $10.00*

☐ **#1491 TesSeRact** Discover how to create TSR (terminate and stay resident) programs. *Requires Hard drive. Registration Fee: $25.00 for source code and $10.00 for newsletter.*

☐ **#2056, 2057, 2624 UniScreen** Programmers, build professional looking screens quickly and interactively with UNISCREEN, the universal screen format generator. *Registration Fee: $49.00*

Quotes, Bids, and Estimating

☐ **#1383, 1384 PC-Estimator** Estimates building costs for projects of all sizes and kinds, from skyscrapers to kitchen remodeling. *Requires 448K RAM, hard drive, two floppy drives, and a printer. Registration Fee: $99.00.*

Test and Quiz Preparation

☐ **#2298 The Explorers** Here's a great tool for anyone that has an interest in early American history. This program is made up of two parts: the EXPLORER HISTORIES and the EXPLORER QUIZ. *No special requirements. Registration Fee: $10.00*

Utilities, System or Hardware

☐ **#2339, 2340 Programmer's Productivity Pack** Productivity tools for programmers. Programmer's calculator, keystroke reference center, ASCII & color attribute chart, keystroke recording and playback, screen capture with filtering, background printing, DOS shell, and more. Swapping version keeps only 7K RAM while resident *No special requirements. Registration Fee: $79.00*

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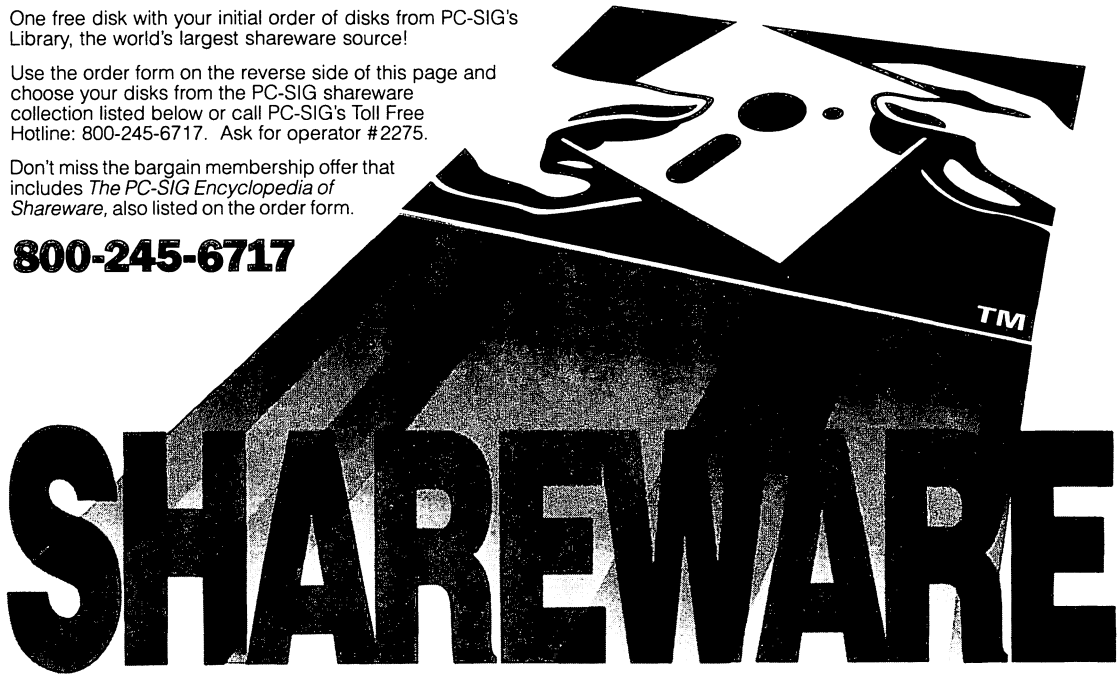

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Archive/Compression Utilities

☐ **#1330 PKPAK, PKUNPAK, and PKSFX** A set of archiving utilities for the most efficient use of disk space. *No special requirements. Registration Fee: $20.00*

Artificial Intelligence

☐ **#883 XXXpert** Create an expert system on any subject you like. A question-and-answer diagnostic program will help to solve problems consistently. *Requires 512K RAM. Registration Fee: $29.00*

Paint and Drawing Programs

☐ **#1305 Fantasy** Use your mouse or cursor keys to create colorful flowing designs and animated art. Save to disk to replay whenever you like. *Requires CGA. Mouse optional. Registration Fee: $20.00*

Printer Managers

☐ **#609 Disk Spool II** DISK SPOOL II allows you to print while you continue computing. *No special requirements.* Registration Fee: $44.00

☐ **#718 LQ Printer Utility** Your dot matrix printing can have a near-letter-quality look. Added on is a 400K print spooler. You can also create log's and modify character sets. *Requires Epson or compatible printer. Registration Fee: $35.00*

Printer Utilities, Laser

☐ **#1462 DeskJet Softfonts & Utilities** HP DeskJet owners rejoice! Available now — a complete package of 25 different soft fonts and a fast download program written especially for the HP DeskJet. Requires HP DeskJet with 128K RAM cartridge. *Registration Fee: $25.00*

☐ **#1463 LaserJet Soft Fonts and Utilities** SOFT FONTS AND UTILITIES is a boon to laser printer owners. Imagine a great font downloader, handy utilities, and a wealth of incredibly useful soft fonts — all in one package! *Requires HP LaserJet or compatible. Registration Fee: $25.00*

Printing, Sideways

☐ **#1184 ON-Side** Spreadsheets too wide to fit on the page? Now you can print any spreadsheet from almost any program that sends printed output to disk. *Requires Dot matrix printer. Registration Fee: $19.95*

Security — File, Disk, or System

☐ **#1146 Login** Control access to your computer with passwords and logging-on routines. Create user audit trails. *Requires hard drive.* Registration Fee: $25.00

☐ **#2095 VIRUSCAN** VIRUSCAN stops viruses in their tracks. It scans diskettes or entire systems for known viruses, identifies the intruder, removes the virus, and often repairs the damage to the system. No special requirements. *Registration Fee: $25.00*

Utilities, Macro Programs

☐ **#181 NEWKEY** Redefine your keyboard with this keyboard macro utility. Assign a complex series of keystrokes to a single key. Work more accurately and quickly. *No special requirements. Registration Fee: $43.00*

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☐ **#2641, 2642, 2643 Back & Forth** Back & Forth is a *versatile* program management tool that allows you to load up to 20 programs at once and instantly switch between them. Now you can switch between your word

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processor, spreadsheets, databases, and utilities at will without having to exit, reload, or wait. *Requires DOS 3.0+ and EMS, RAM disk or hard disk. Registration Fee: $69.95*

☐ **#1773 4DOS** This COMMAND.COM replacement enhances most DOS commands and provides more than 30 new commands. You'll wonder how you ever got along with DOS alone. *Registration Fee: $50.00*

☐ **#1834 AT-Slow** Slow down your AT or 386 machine to a speed better suited to your favorite games or older applications. *Requires 80286 or 80386 processor based PC. Registration Fee: $10.00*

☐ **#1781 CMOS-RAM/CHEKCMOS** Eventually the batteries in your AT will run out! What happens then you ask? Well, your computer just won't boot up. CMOS_RAM stores all battery maintained information on a disk file for easy restoration. *Requires AT-compatible or any computer that stores setup information in CMOS RAM. Registration Fee: $5.00*

☐ **#870 HGCIBM** Run software written for the IBM Color Graphics Adapter even if you have a Hercules monochrome graphics card. A "must own". *Requires Hercules graphics. Registration Fee: $10.00*

☐ **#1037 PC-Kwick** Use the memory you have to better advantage with selective memory strategies. Store frequently-read data in RAM memory, with speedier access than mechanical drives. *Requires 384K RAM. Registration Fee: $5.00 to $26.00.*

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☐ **#1218 Reconfig by Optimal** Helps you set up your AUTOEXEC.BAT and CONFIG.SYS, plus store up to 100 different configurations. *No special requirements. Registration Fee: None.*

☐ **#1957 VMS40** A device driver that turns a hard disk or floppy disk into LIM4 expanded memory. It is a software emulation of the standard set by the Lotus/Intel/Microsoft Expanded Memory Standard (LIM/EMS) v4.0. *No special requirements. Registration Fee: $25.00*

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☐ **#2623 SYSTEM MASTER** SYSTEM MASTER is an excellent application launcher with multiple menu levels, password protection and excellent DOS support. With over 300 pre-defined menu items covering all DOS commands and extensive documentation, this disk makes it one of the best in this category. Most of the standard features such as mouse support, online help, and custom setups are included and make the program a best buy. *Requires 384K RAM. Registration Fee: $42.00*

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☐ **#2622 LOGIMENU** This is the new generation of DOS menu systems. Whether you're a user who wants to access a few programs quickly and easily (with a touch of a key or two) or a user who needs to turn on all the bells and whistles, LOGIMENU should satisfy you. Extensive on-line help, EGA/VGA 43/50 line mode supported, mouse support, with passwords, screen saver, hidden hot keys, customizable help. All this, plus an attractive presentation. *Requires 384K RAM and DOS 3.0+.* Registration Fee: $50.00 + $5.00 S&H

Printer Utilities

☐ **#2654 LQMatrix** LQMATRIX is an editor for user-made characters (Soft fonts) for Epson LQ 24 pin dot matrix printers and compatibles. It comes with the editor, a downloader, LQ.EXE, and over 40 complete fonts, including a wide variety of common fonts, serif, script, etc. as well as old English, Gothic, two Cyrillic fonts, and classical Greek. *Requires Epson LQ 24-pin dot matrix printer or compatible. Registration Fee: $19.50 ($24.00 overseas)*

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This disk contains three self-extracting programs. When these programs are run, they will extract the files listed below. If you are using a hard drive, copy each program into its own subdirectory. If you are using floppy drives, copy each program to its own blank formatted disk. To extract the files, type the name of the program at the DOS prompt. There is not enough space on a 360K floppy to extract all of the files contained in O-SIDE.EXE. Floppy users need to put a disk containing O-SIDE.EXE in the A drive and a blank formatted disk in the B drive. Then type:

A:O-SIDE B:

This will extract all of the files to the B drive.

Files contained in each program

R-CONFIG.EXE	O-SIDE.EXE	OTHERS.EXE
INSTALL.BAT	ONSIDE.EXE	VMS40.240
INSTALL.TXT	BOLD.FNT	ZIP.EXE
RECONFIG.EXE	DUVALL.FNT	ZIPTEST.EXE
RECONFIG.TXT	NORMAL.FNT	CHEKCMOS.EXE
	PICA.FNT	CMOS_RAM.EXE
	SMALL.FNT	
	TINY.FNT	
	VOGUE.FNT	

These are shareware distribution copies and are for evaluation only. If you want to continue to use them, you must register with the shareware authors.

With the DOS shareware programs in this book, you can instantly maximize the performance and management of your DOS system. ***DOS Shareware Utilities*** reveals new ways to unlock the hidden powers of DOS and get around the not-so-hidden limitations, offering detailed, illustrated information on 18 of the most popular shareware utility software packages available, including:

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- GEMCAP
- PKZIP
- 4DOS
- Swap Shop
- CMOS—RAM/CHEKCMOS
- Disk Spool II

. . . and many more. The programs contain descriptions of all file parameters and registration addresses, as well as explanations of what the programs do and how they do it. Plus, two font packages are offered: DeskJet Softfonts and LaserJet Softfonts.

Each of the main sections begins with the name of the shareware package, the disk number (to help you order the disk), and any special hardware and software requirements that the package has. Designed as a user's manual to be referenced while you are actually working with the software, ***DOS Shareware Utilities*** gives you the newest, most innovative shareware programs on the market.

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For more than seven years, **PC-SIG, Inc.** has bridged the gap between software authors and end-users by bringing the finest shareware programs to the attention of software buyers. In addition to being the publishers of SHAREWARE magazine—which boasts more than 100,000 subscribers—and numerous other publications, PC-SIG is also the world's largest distributor of shareware and public domain utilities.

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